Ch. 1 Equations and Inequalities

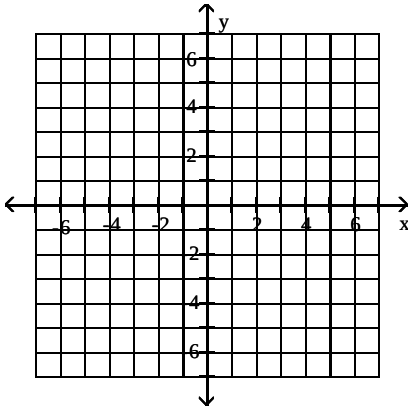
1.1 Graphs and Graphing Utilities

1 Plot Points in the Rectangular Coordinate System

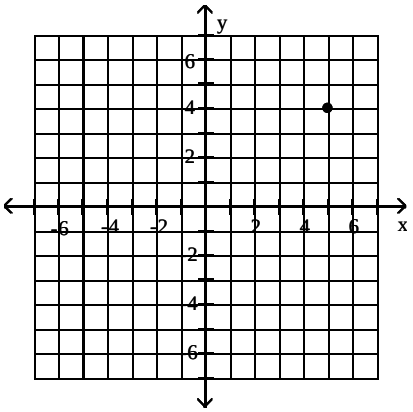
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Plot the given point in a rectangular coordinate system.

1) (5, 4)



A)



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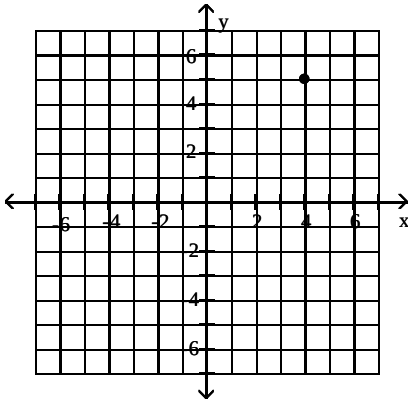

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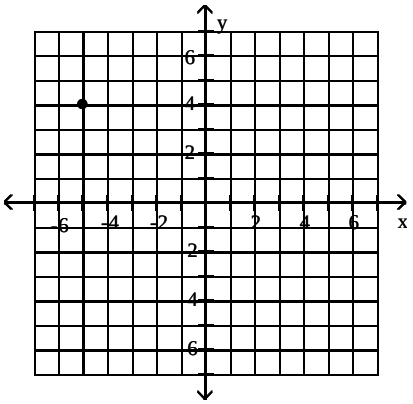
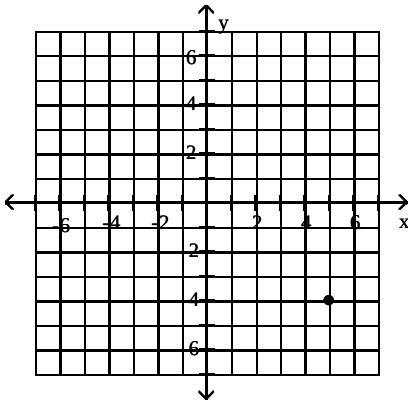
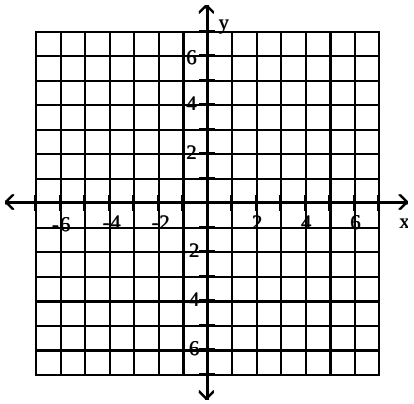


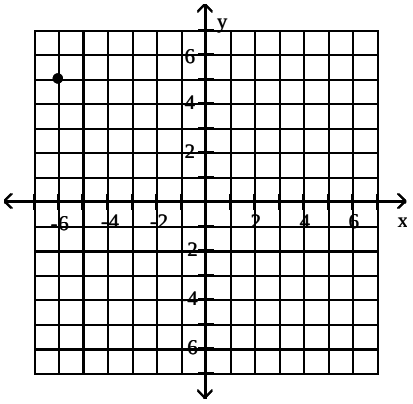
D)



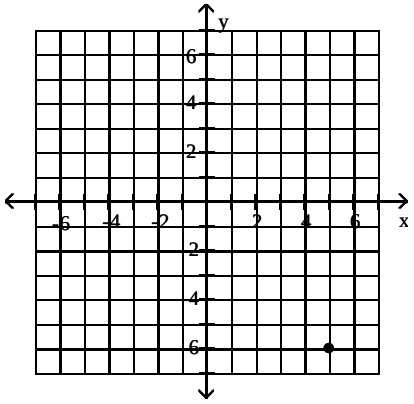
2) (–6, 5)



A)



B)



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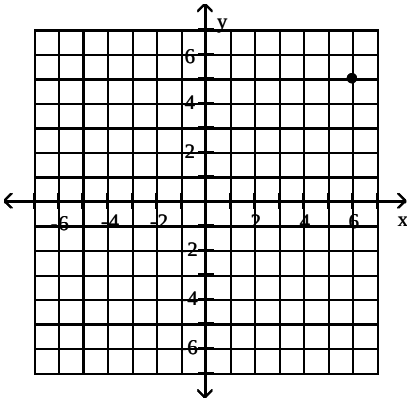

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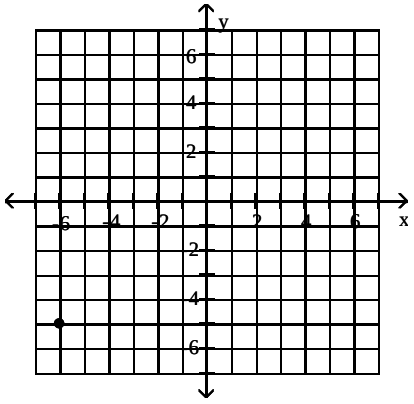
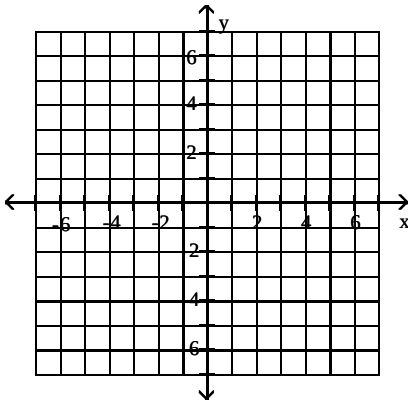


3) (2, –3)



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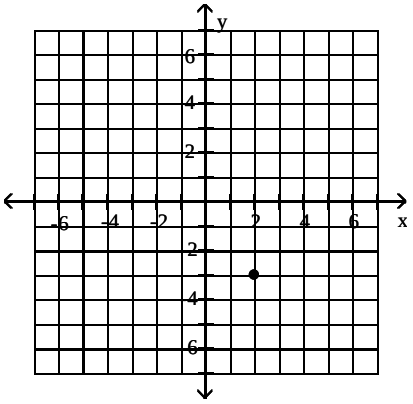

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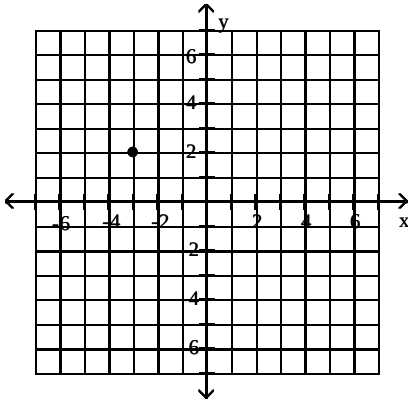

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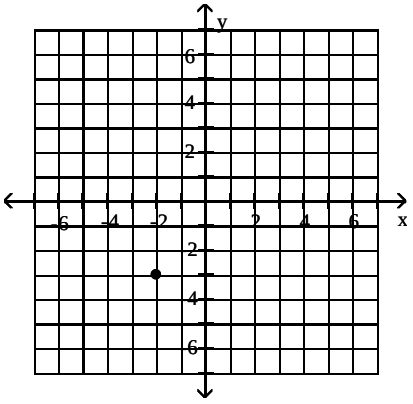

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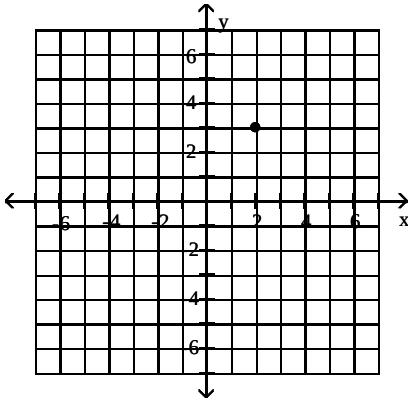
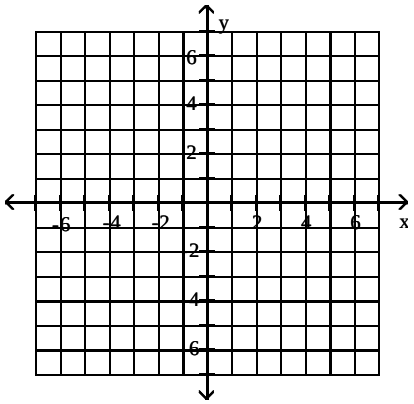


4) (–6, –3)



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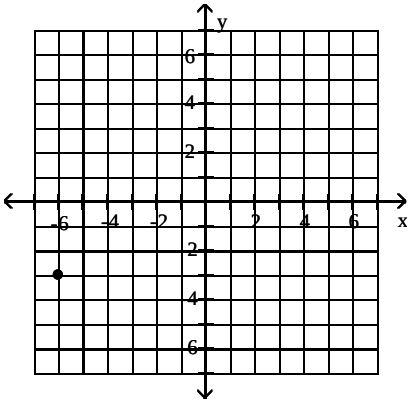

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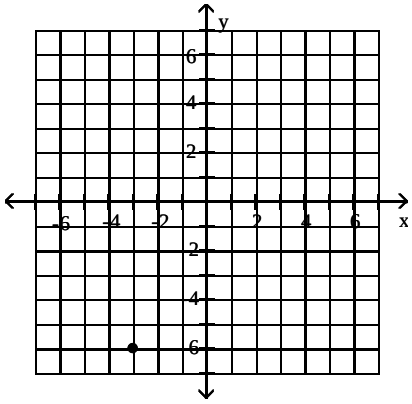

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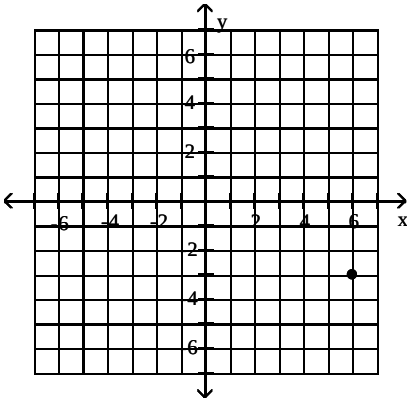

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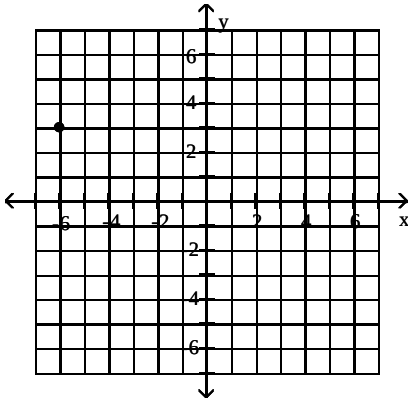
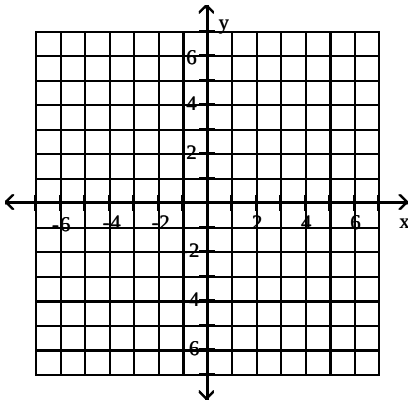
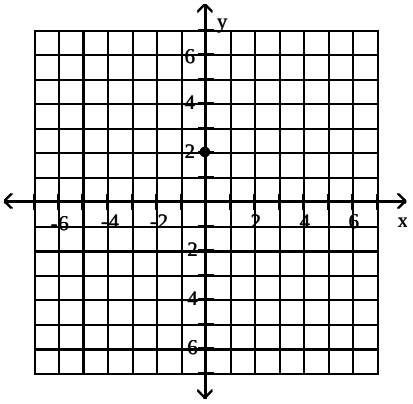


5) (0, 2)



A)



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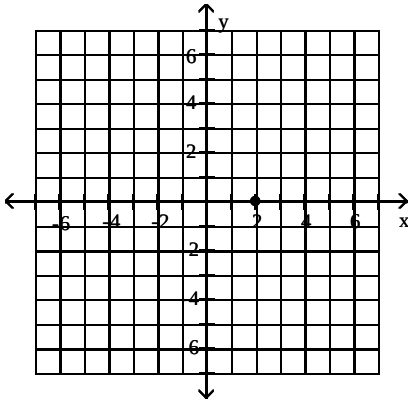

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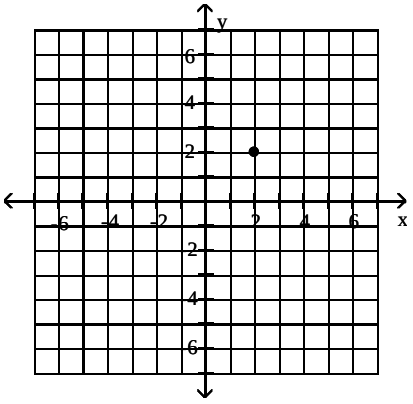

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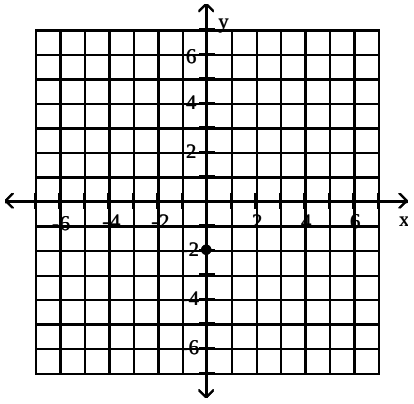
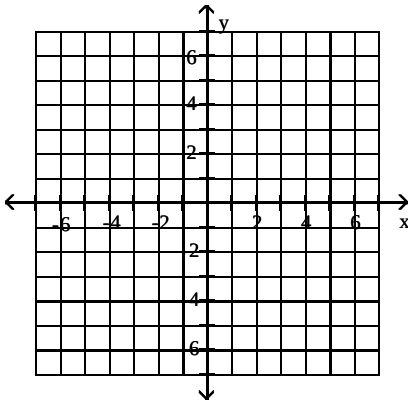
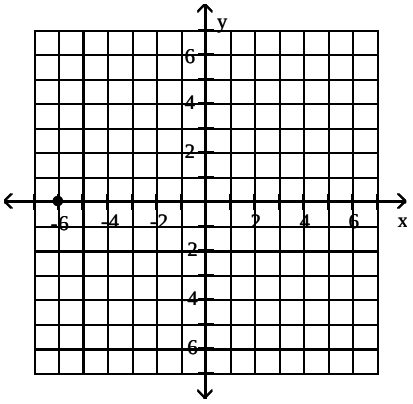


6) (–6, 0)



A)



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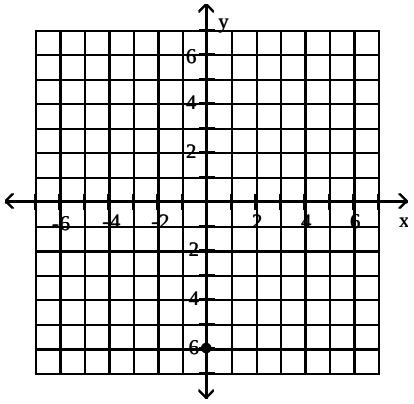

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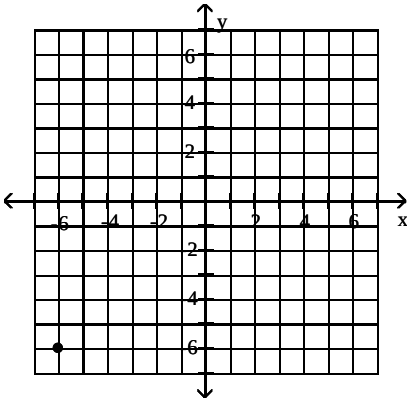

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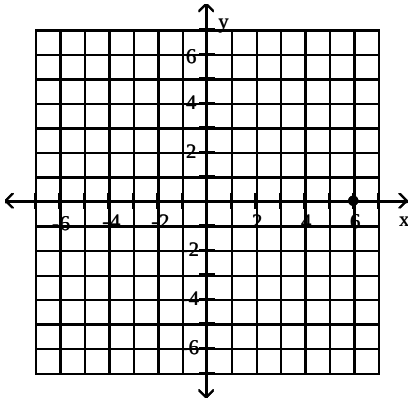
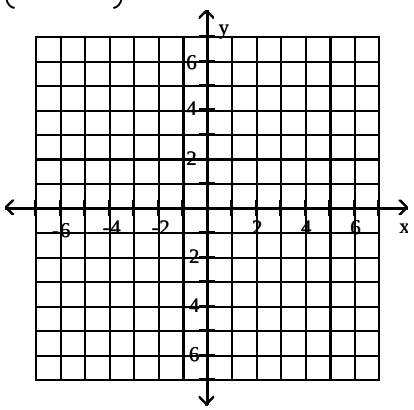
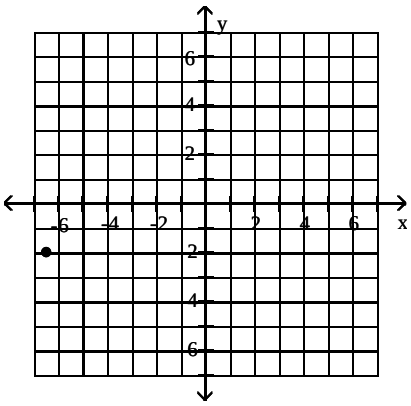


7) $\left(-\frac{13}{2}, -2\right)$



A)



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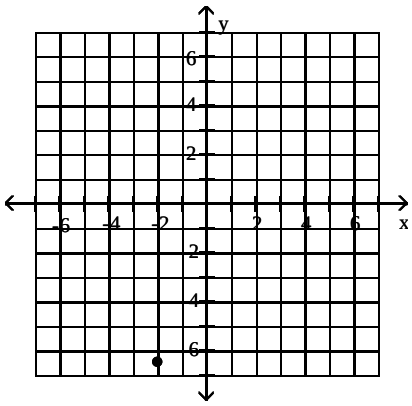

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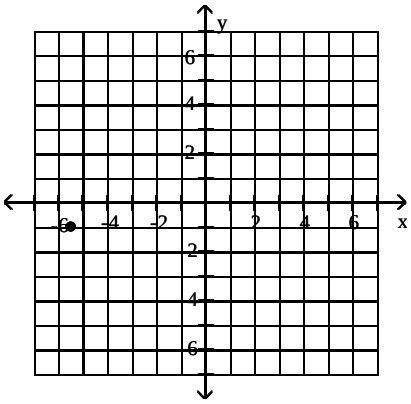

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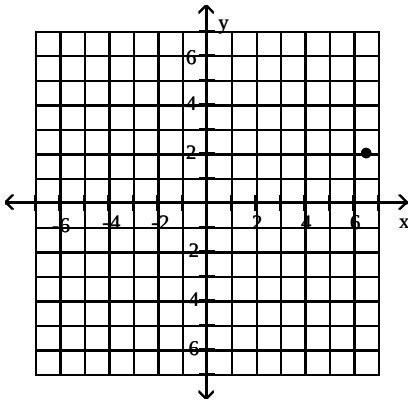
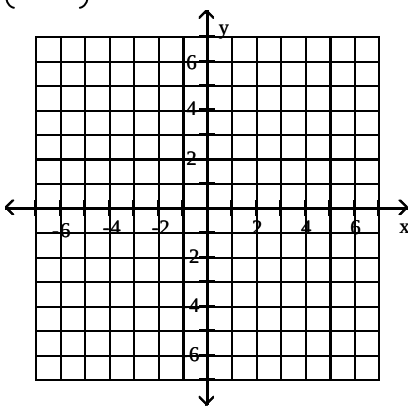
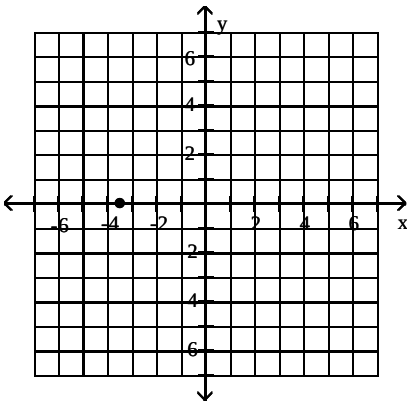


8) $\left(-\frac{7}{2}, 0\right)$



A)



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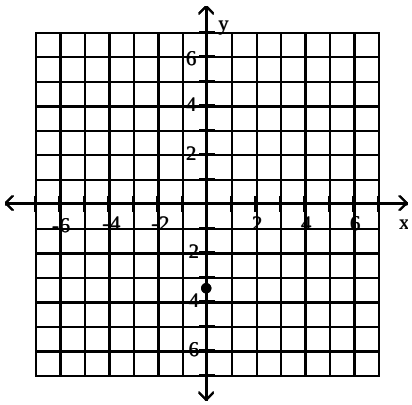

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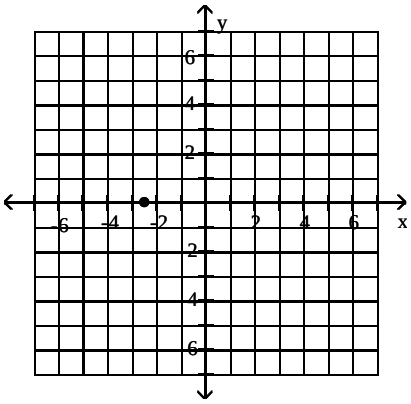
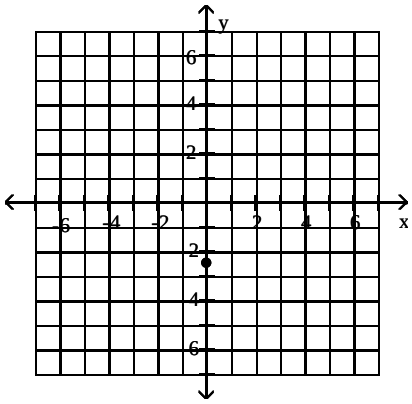


D)

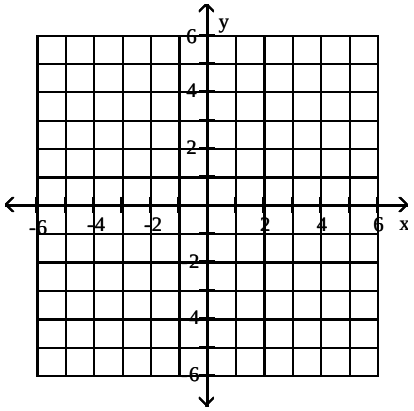


2 Graph Equations in the Rectangular Coordinate System

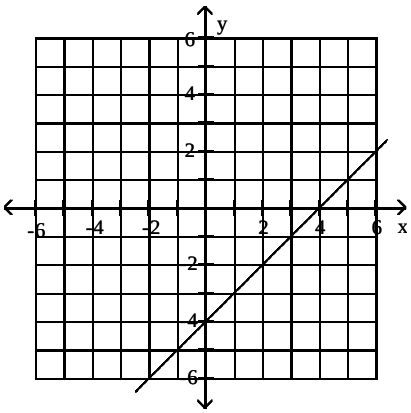
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Graph the equation.

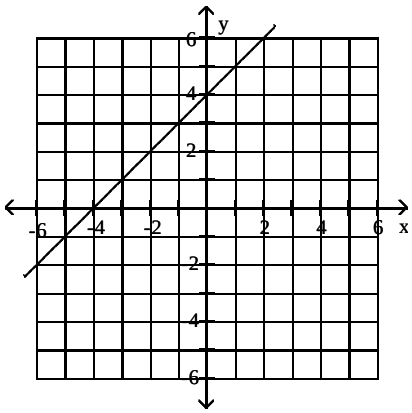
1) $y = x - 4$



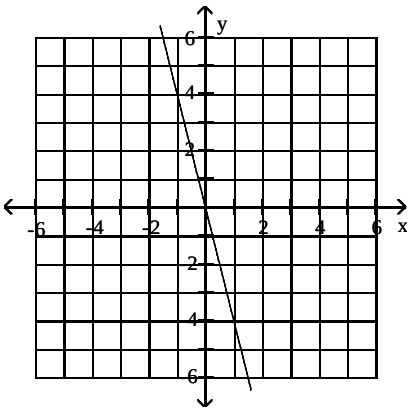
A)



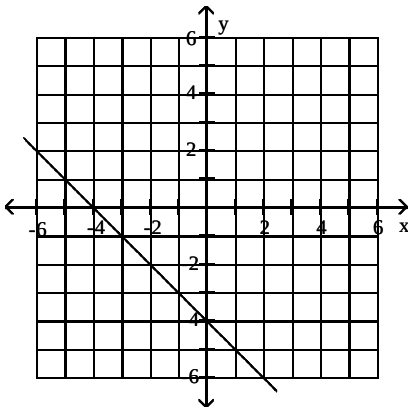
B)



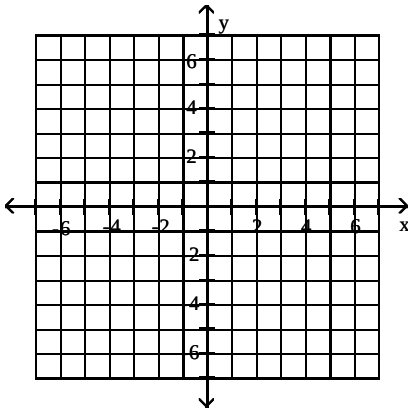
C)



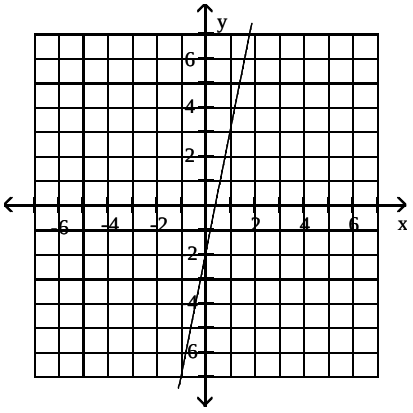
D)



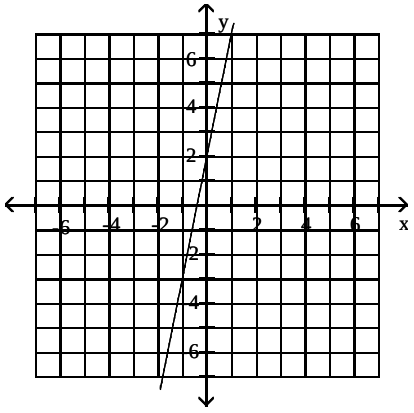
2) $y = 5x - 2$



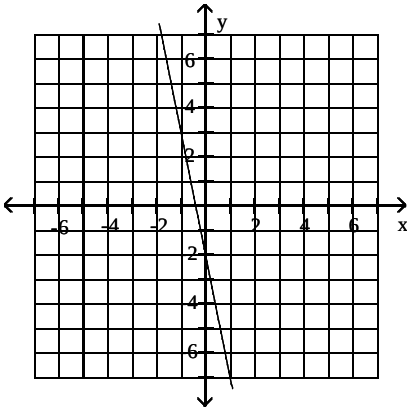
A)



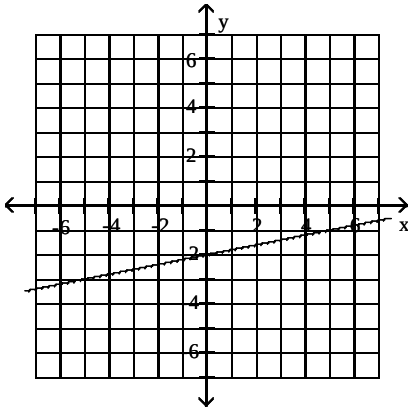
B)



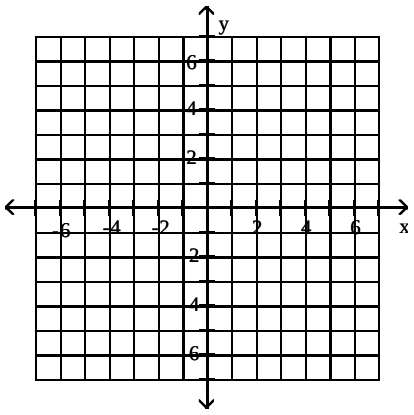
C)



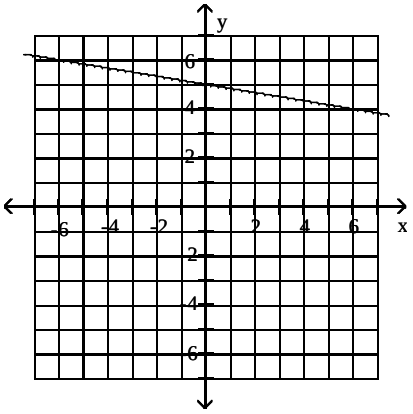
D)



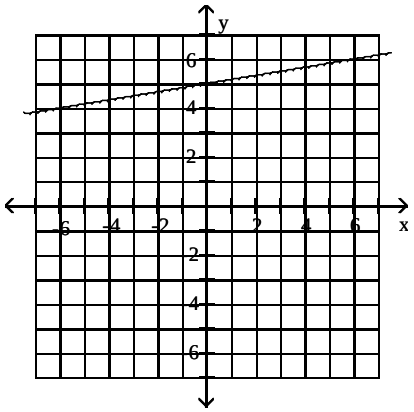
3) $y = -\frac{1}{6}x + 5$



A)



B)



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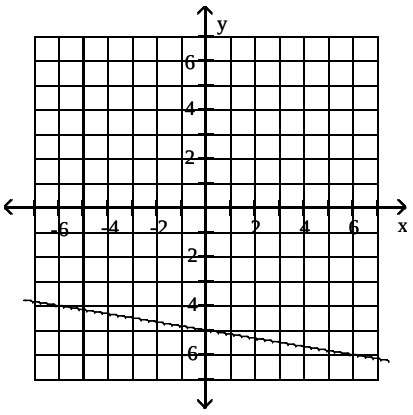
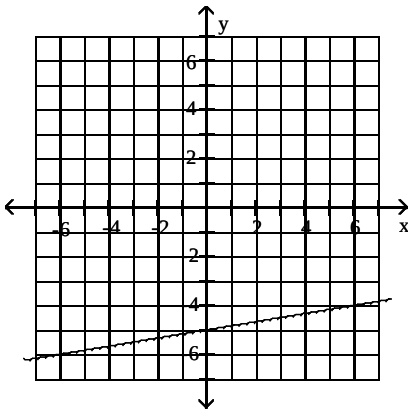
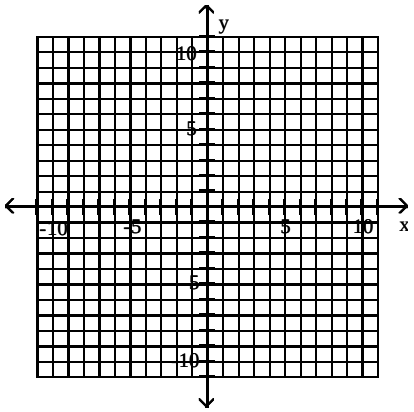


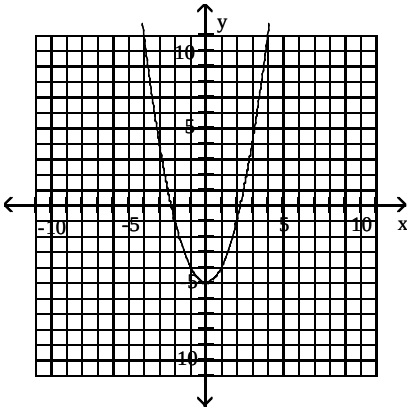
D)



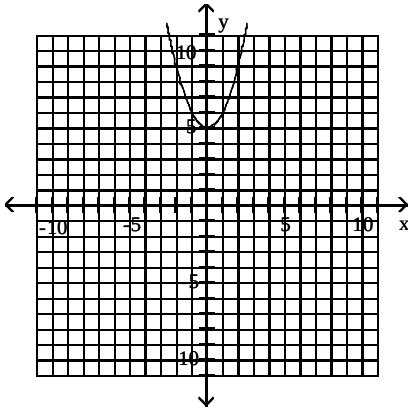
4) $y = x^2 - 5$



A)



B)



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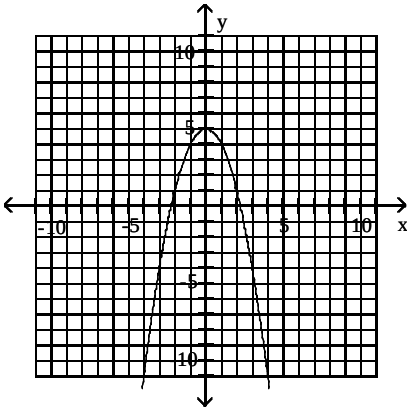
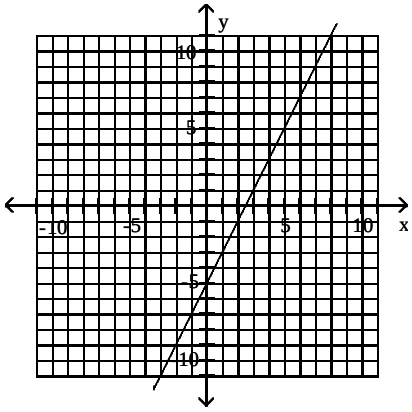
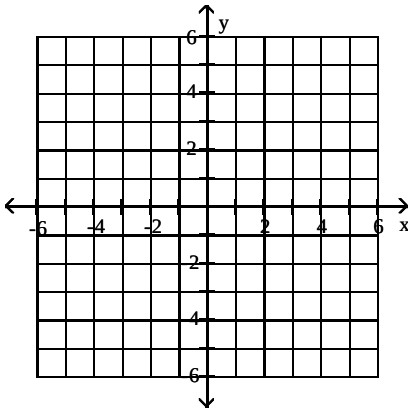


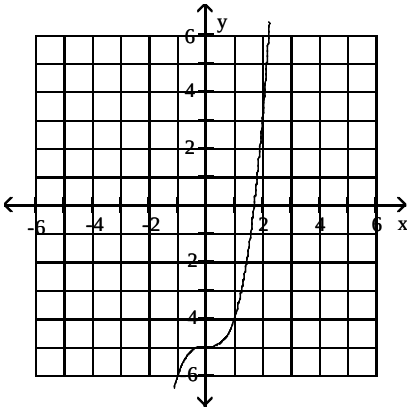
D)



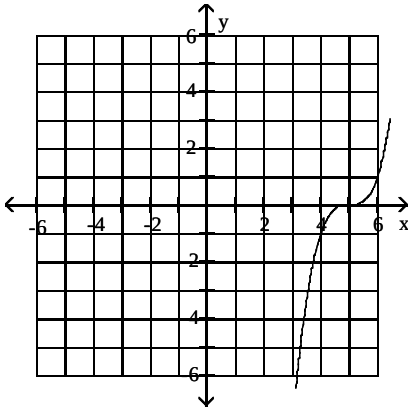
5) $y = x^3 - 5$



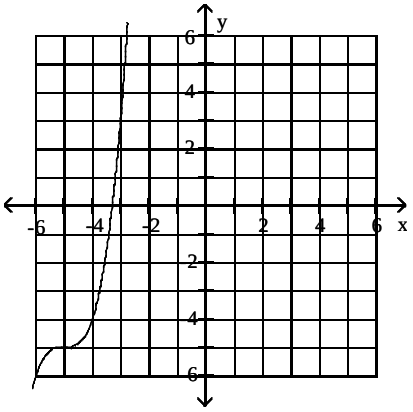
A)



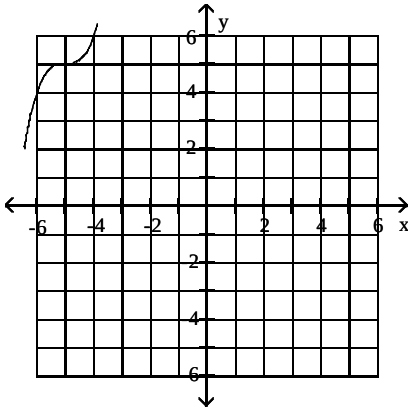
B)



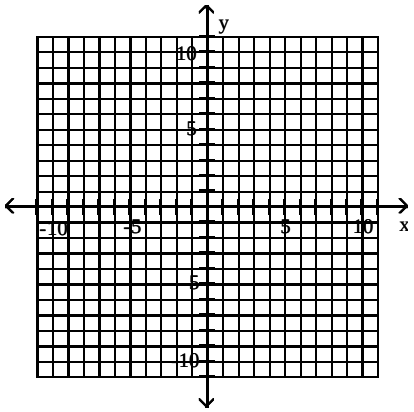
C)



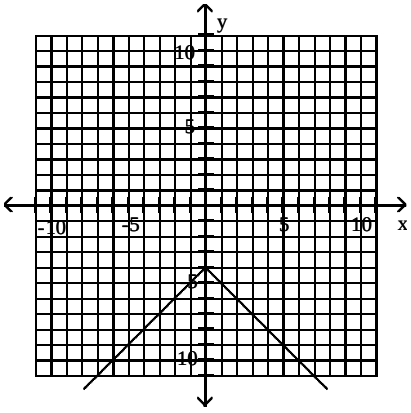
D)



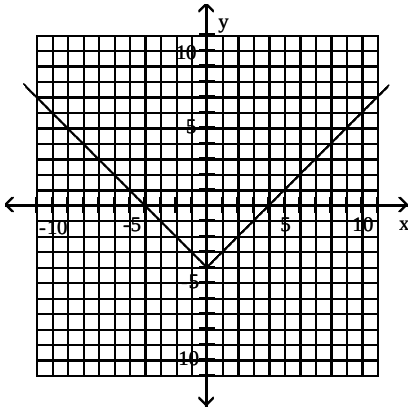
6) $y = -|x| - 4$



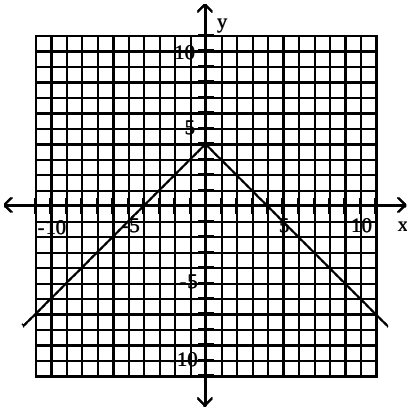
A)



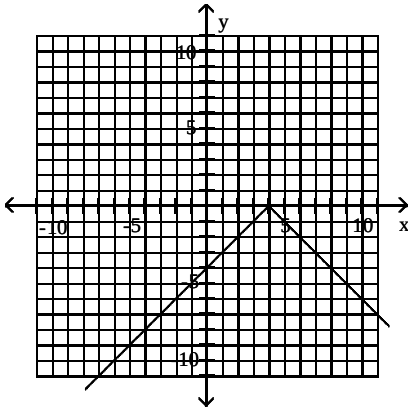
B)



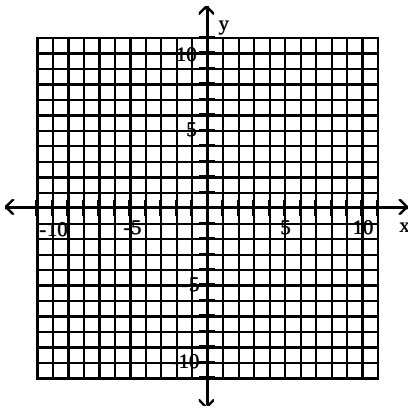
C)



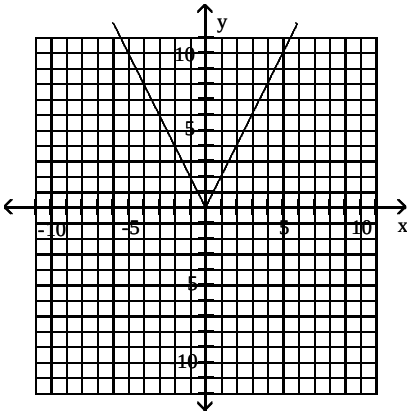
D)



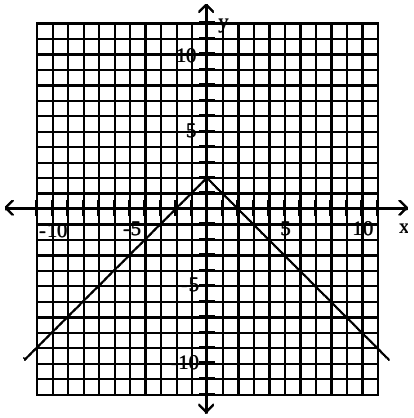
7) $y = 2|x|$



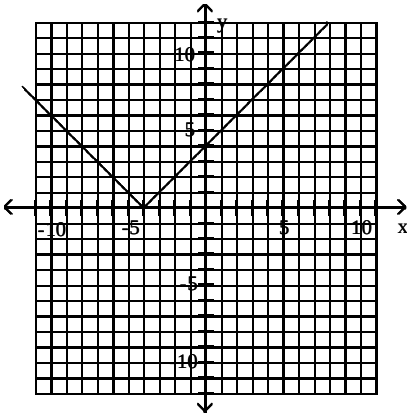
A)



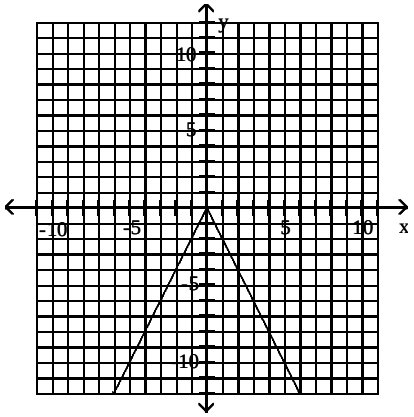
B)



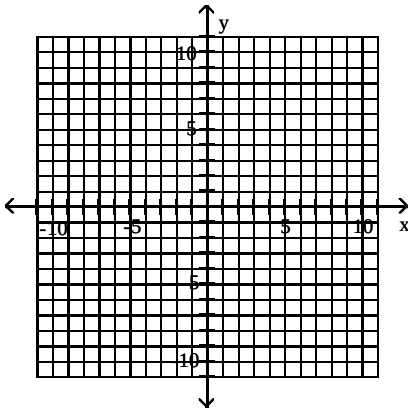
C)



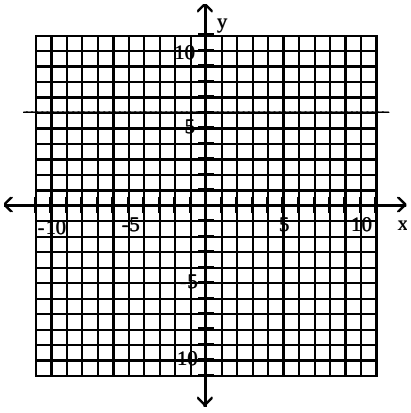
D)



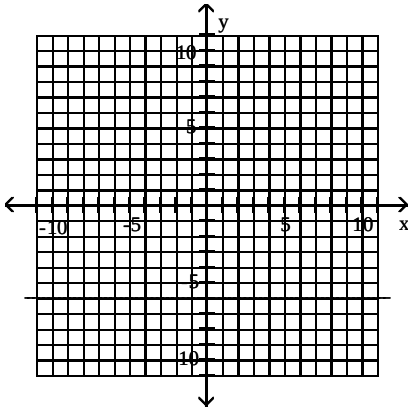
8) y = 6



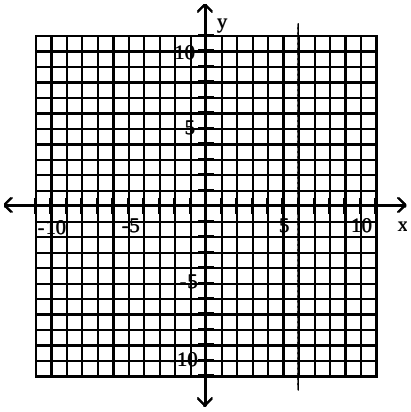
A)



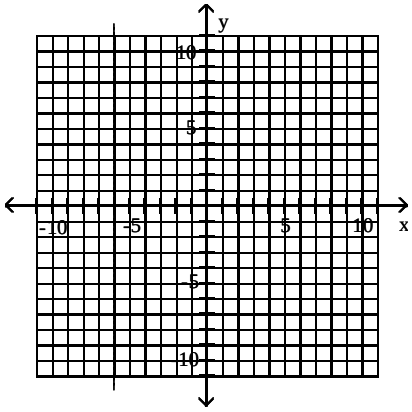
B)



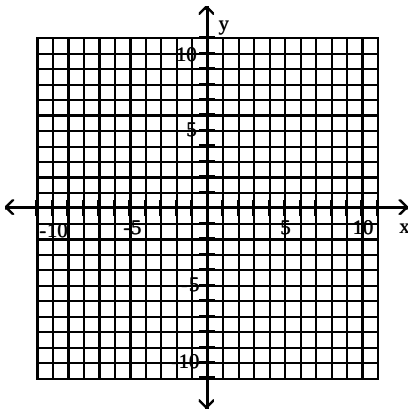
C)



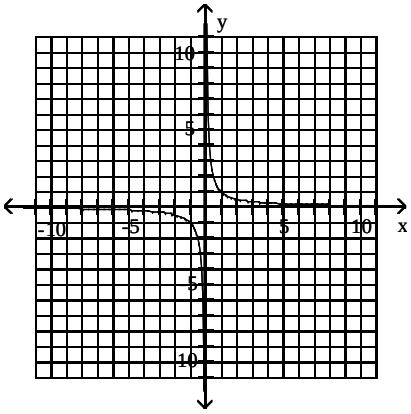
D)



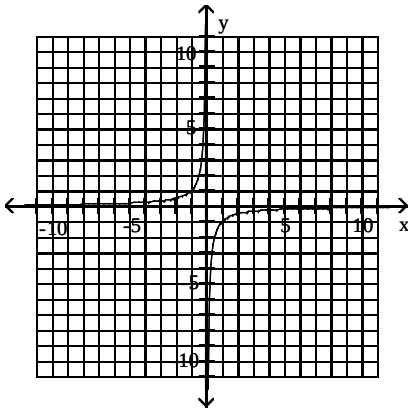
9) $y = \frac{1}{x}$



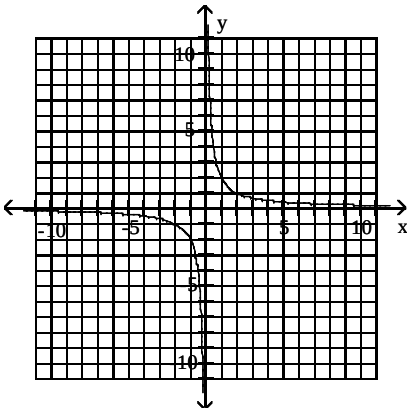
A)



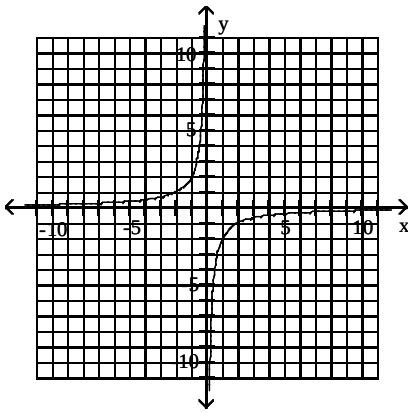
B)



C)

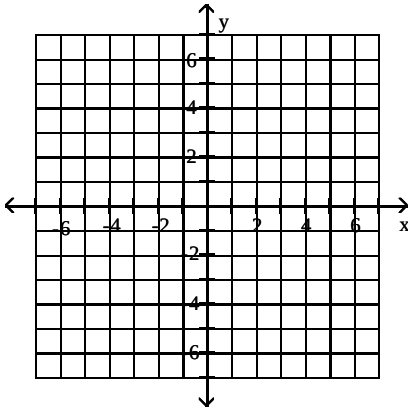


D)

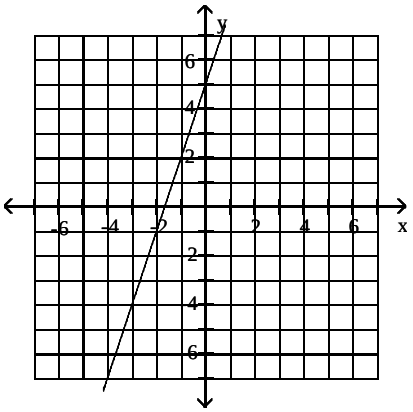


Write the English sentence as an equation in two variables. Then graph the equation.

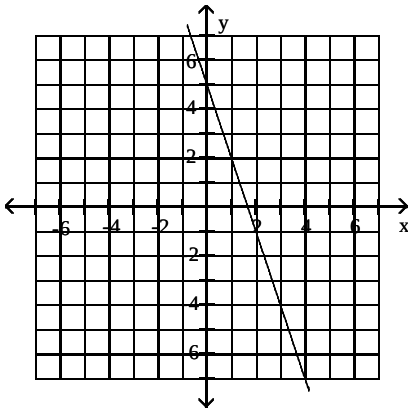
10) The y–value is five more than three times the x–value.



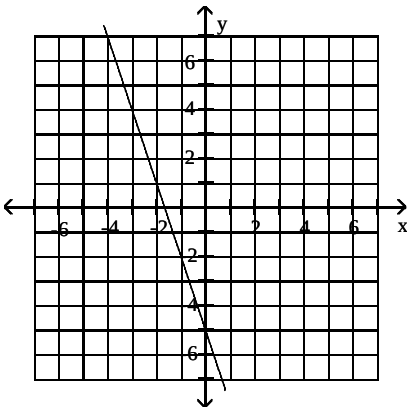
A) $y = 3x + 5$



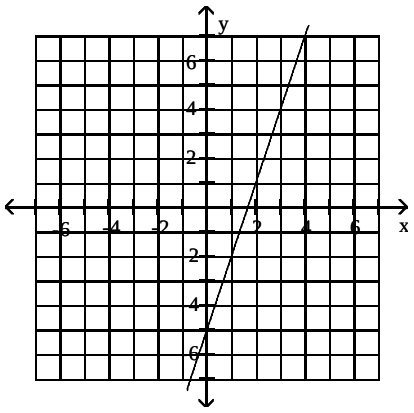
B) $y = -3x + 5$



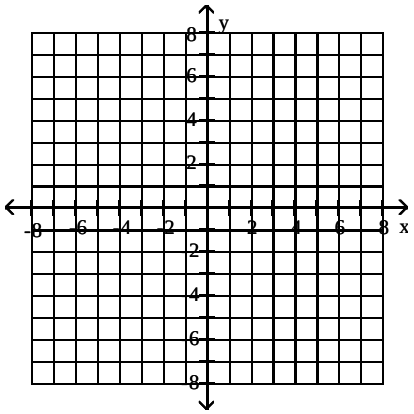
C) $y = -3x - 5$



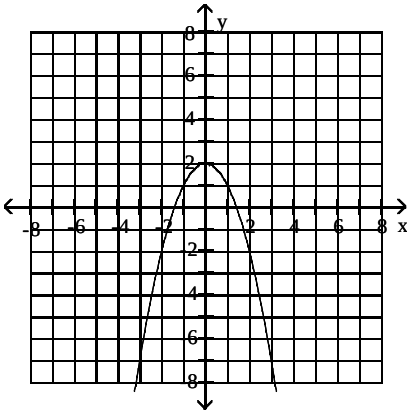
D) $y = 3x - 5$



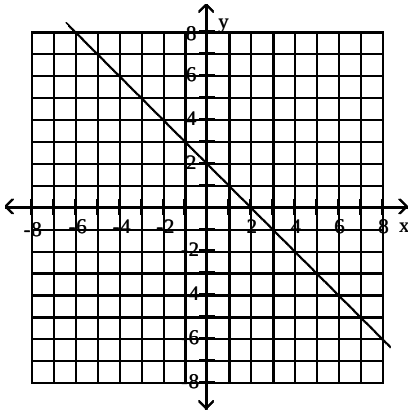
11) The y–value is two decreased by the square of the x–value.



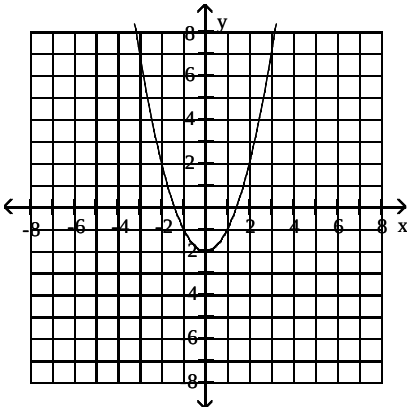
A) $y = 2 - x^2$



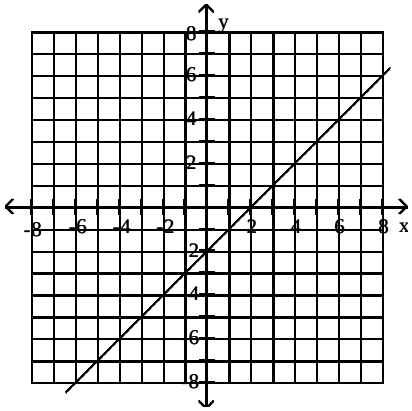
B) $y = 2 - x$



C) $y = x^2 - 2$



D) $y = x - 2$

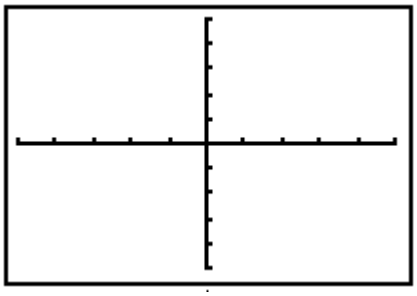


3 Interpret Information About a Graphing Utility's Viewing Rectangle or Table

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Match the correct viewing rectangle dimensions with the figure.

1)



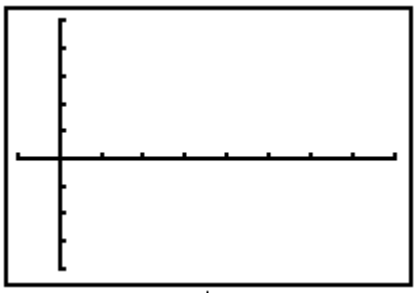
A) [–5, 5, 1] by [–5, 5, 1]

B) [–1, 1, 1] by [–1, 1, 1]

C) [–10, 5, 1] by [–10, 5, 1]

D) [–5, 5, 2] by [–5, 5, 2]

2)



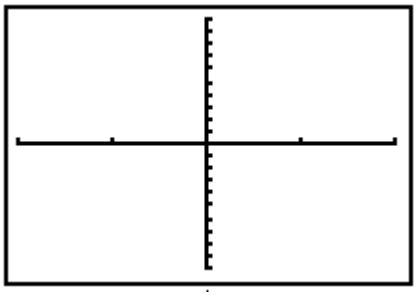
A) [–5, 40, 5] by [–20, 25, 5]

B) [–5, 40, 5] by [–5, 40, 5]

C) [–20, 25, 5] by [–5, 40, 5]

D) [–50, 25, 5] by [–50, 25, 5]

3)



A) [–2, 2, 1] by [–40, 40, 4]

B) [–8, 8, 2] by [–2, 2, 1]

C) [–2, 2, 1] by [–2, 2, 1]

D) [–10, 10, 1] by [–10, 10, 1]

4)

A) [–20, 60, 20] by [–800, 1000, 200]

B) [–2, 16, 2] by [–2, 16, 2]

C) [–2, 10, 2] by [–8, 16, 2]

D) [–20, 10, 2] by [–20, 10, 2]

The table of values was generated by a graphing utility with a TABLE feature. Use the following table to solve.

X	Y_1	Y_2
-3	9	-3
-2	4	-1
-1	1	1
0	0	3
1	1	5
2	4	7
3	9	9

5) Which equation corresponds to Y_2 in the table?

A) $y_2 = 2x + 3$

B) $y_2 = 3 - 2x$

C) $y_2 = x + 3$

D) $y_2 = 3x - 2$

6) Does the graph of Y_1 pass through the origin?

A) Yes

B) No

7) At which points do the graph of Y_1 and Y_2 intersect?

A) (–1, 1) and (3, 9)

B) (2, 7) and (2, 4)

C) (–1, 1) and (2, 7)

D) (2, 4) and (3, 9)

8) For which values of x is $Y_1 = Y_2$?

A) –1 and 3

B) 0 and 3

C) –1 and 0

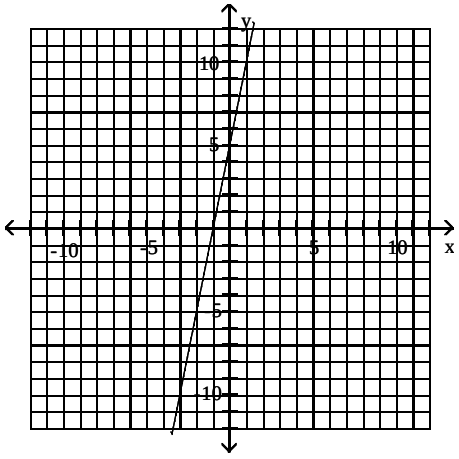
D) 0 and 2

4 Use a Graph to Determine Intercepts

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use the graph to determine the x– and y–intercepts.

1)



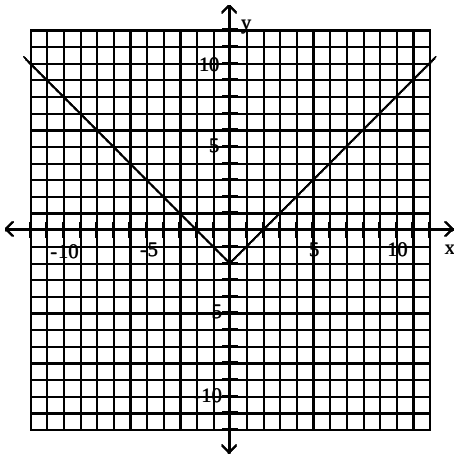
A) x–intercept: –1; y–intercept: 5

B) x–intercept: 1; y–intercept: 5

C) x–intercept: –1; y–intercept: –5

D) x–intercept: –5; y–intercept: 5

2)



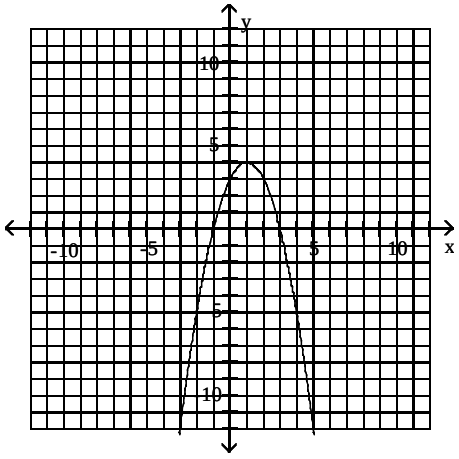
A) x–intercepts: –2, 2; y–intercept: –2

B) x–intercepts: –2, 2

C) y–intercept: –2

D) x–intercepts: –2, 2; y–intercept: 0

3)



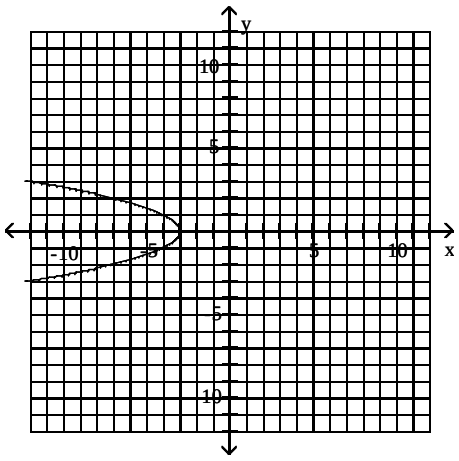
A) x–intercepts: –1, 3; y–intercept: 3

B) x–intercept: –1; y–intercepts: 3, 3

C) x–intercept: 3; y–intercepts: –1, 3

D) x–intercept: 3; y–intercept: 3

4)



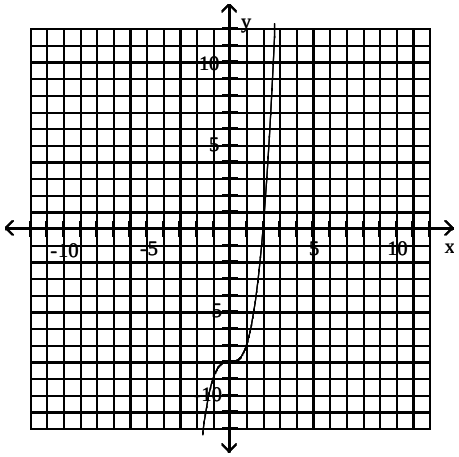
A) x–intercept: –3

B) y–intercept: –3

C) x–intercept: 3

D) y–intercept: 3

5)



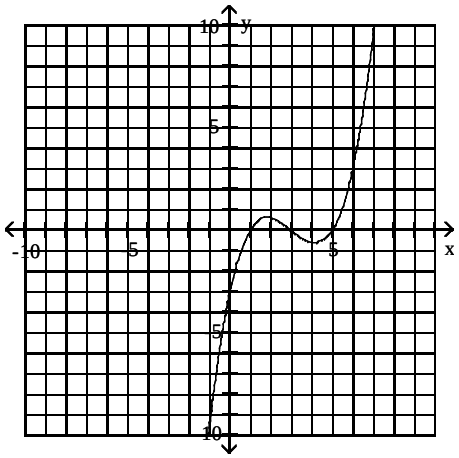
A) x–intercept: 2; y–intercept: –8

B) x–intercept: 2; y–intercept: 8

C) x–intercept: –2; y–intercept: –8

D) x–intercept: –2; y–intercept: 8

6)



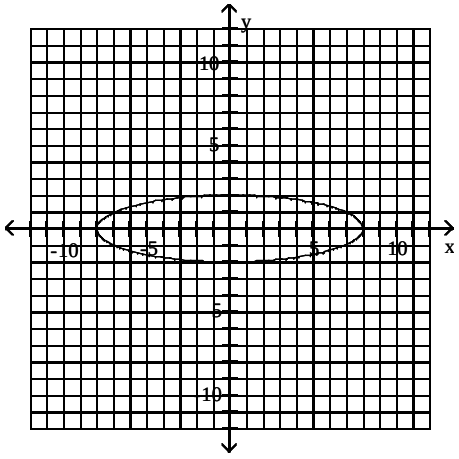
A) x–intercepts: 3, 1, 5; y–intercept: –3

B) x–intercept: –3; y–intercepts: 3, 1, 5

C) x–intercepts: –3, 1, –5; y–intercept: –3

D) x–intercept: –3; y–intercepts: –3, 1, –5

7)



A) x–intercepts: –8, 8; y–intercepts: –2, 2

B) x–intercepts: –8, 8

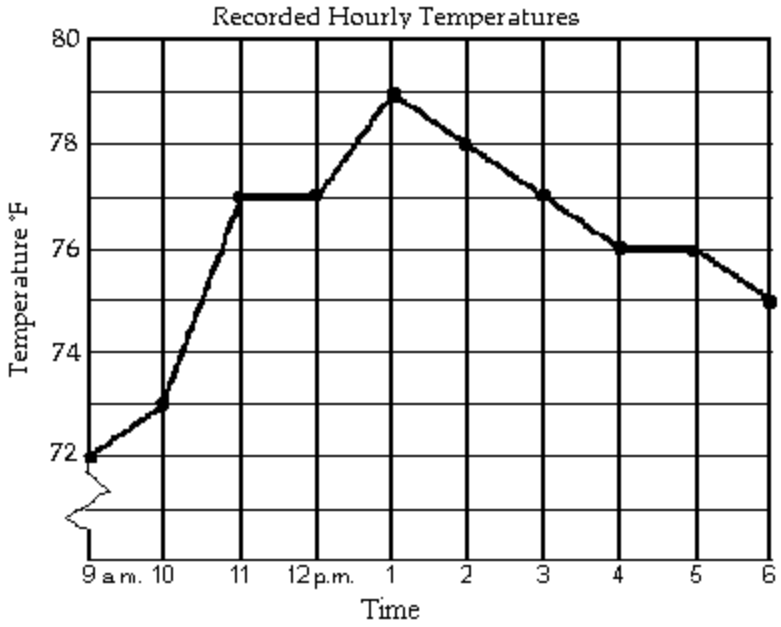
C) y–intercepts: –2, 2

D) x–intercepts: –2, 2; y–intercepts: –8, 8

5 Interpret Information Given by Graphs

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

The line graph shows the recorded hourly temperatures in degrees Fahrenheit at an airport.



1) At what time was the temperature the highest?

A) 1 p.m. B) 5 p.m. C) 11 a.m. D) 2 p.m.

2) At what time was the temperature its lowest?

A) 9 a.m. B) 6 p.m. C) 4 p.m. D) 1 p.m.

3) What temperature was recorded at 2 p.m.?

A) 78 ° F B) 80 ° F C) 76 ° F D) 79 ° F

4) During which hour did the temperature increase the most?

A) 10 a.m. to 11 a.m. B) 1 p.m. to 2 p.m. C) 12 p.m. to 1 p.m. D) 9 a.m. to 10 a.m.

5) At what time was the temperature 72°?

A) 9 a.m. B) 10 a.m. C) 6 p.m. D) 9 a.m. and 10 a.m.

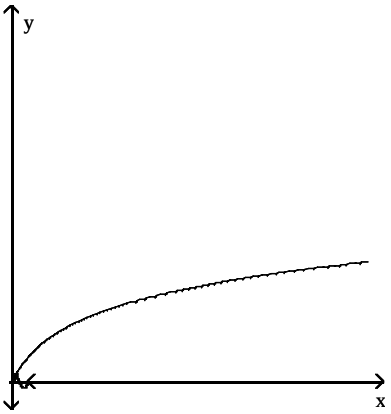
6) During which two hour period did the temperature increase the most?

A) 9 a.m. to 11 a.m. B) 10 a.m. to 11 a.m. C) 12 p.m. to 2 p.m. D) 10 a.m. to 12 p.m.

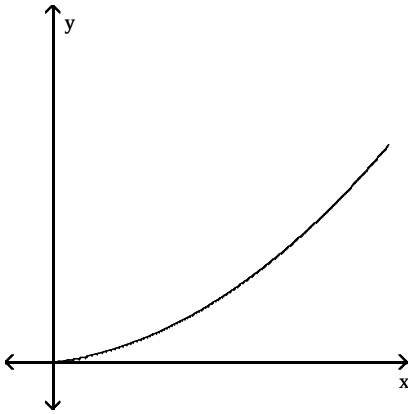
Match the story with the correct figure.

7) The amount of rainfall as a function of time, if the rain fell more and more softly.

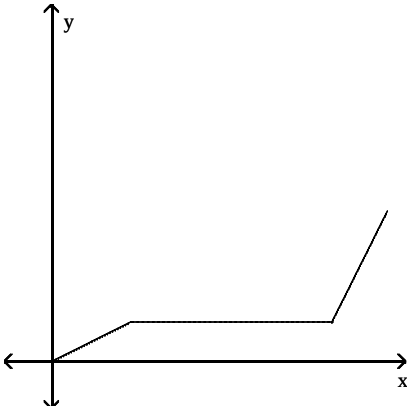
A)



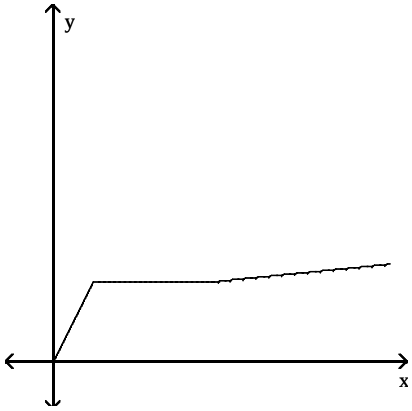
B)



C)

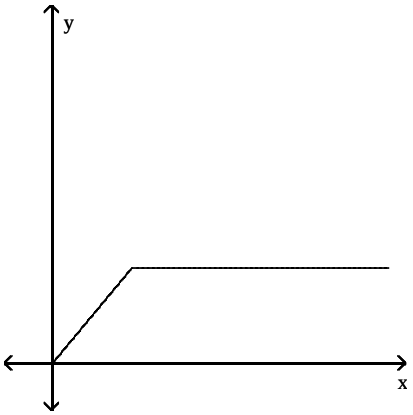


D)



8) The height of an animal as a function of time.

A)



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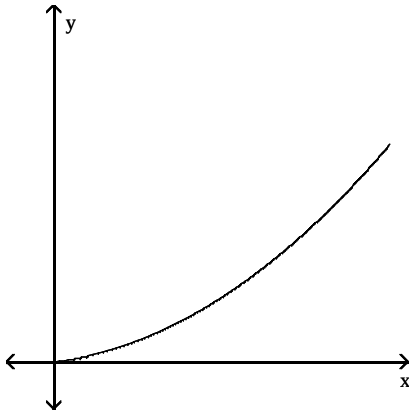
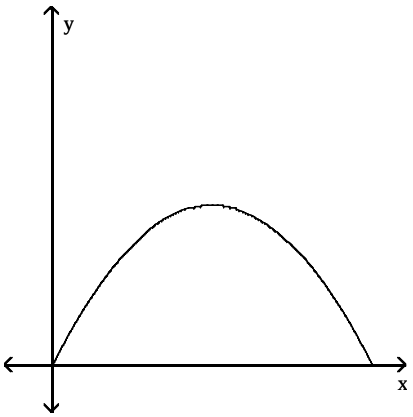


C)



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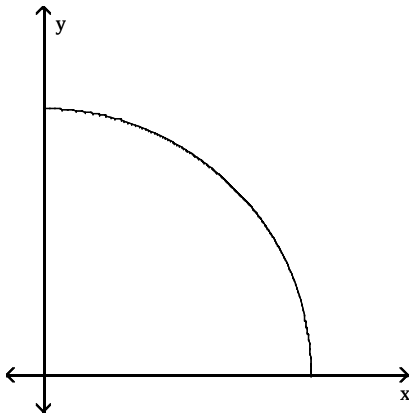
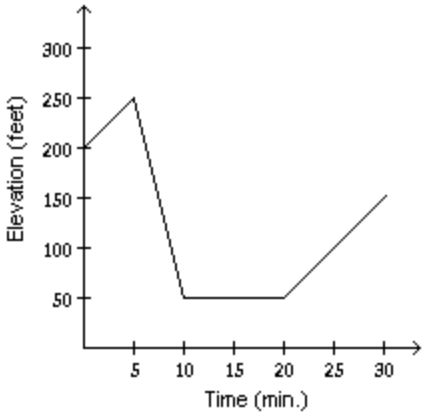


9) Mark started out by walking up a hill for 5 minutes. For the next 5 minutes he walked down a steep hill to an elevation lower than his starting point. For the next 10 minutes he walked on level ground. For the next 10 minutes he walked uphill. Determine which graph of elevation above sea level versus time illustrates the story.

A)



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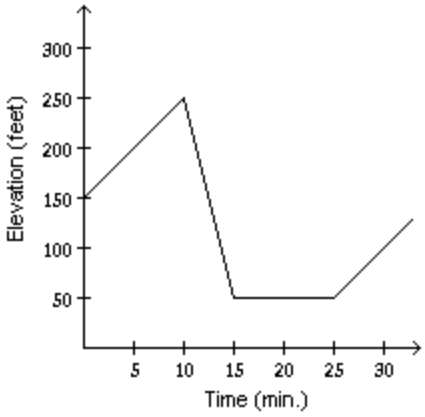
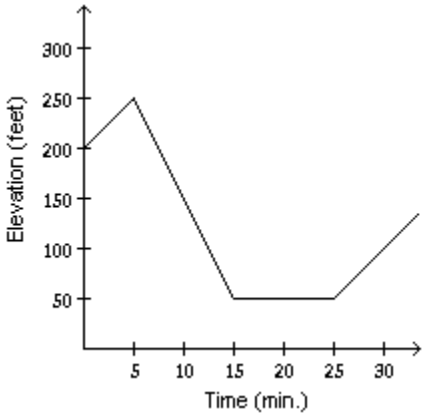
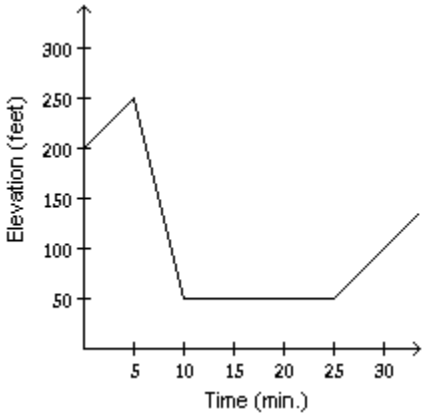


C)



D)



1.2 Linear Equations and Rational Equations

1 Solve Linear Equations in One Variable

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve and check the linear equation.

1) $5x - 5 = 30$

A) {7} B) {30} C) {34} D) {11}

2) $9x - (7x - 1) = 2$

A) $\left\{\frac{1}{2}\right\}$ B) $\left\{\frac{1}{16}\right\}$ C) $\left\{-\frac{1}{2}\right\}$ D) $\left\{-\frac{1}{16}\right\}$

3) $7x - 9 = -10 + 4x$

A) $\left\{-\frac{1}{3}\right\}$ B) $\{-3\}$ C) $\{3\}$ D) $\left\{-\frac{11}{19}\right\}$

4) $(-5x + 4) - 5 = -4(x - 7)$

A) {– 29} B) {29} C) {19} D) {– 6}

5) $-3x + 5 + 6(x + 1) = -2x + 3$

A) $\left\{-\frac{8}{5}\right\}$ B) $\left\{\frac{8}{3}\right\}$ C) $\left\{\frac{2}{5}\right\}$ D) $\left\{-\frac{2}{3}\right\}$

6) $6[-6x + 6 + 4(x + 1)] = 6x + 2$

A) $\left\{\frac{29}{9}\right\}$ B) $\left\{\frac{29}{3}\right\}$ C) $\left\{-\frac{7}{9}\right\}$ D) $\left\{-\frac{7}{3}\right\}$

7) $3^2 - 2(11 - 8)^2 = 36x$

A) $\left\{-\frac{1}{4}\right\}$ B) {4} C) {0} D) $\left\{\frac{7}{4}\right\}$

8) $0.30(80) + 0.60x = 0.40(80 + x)$

A) {40} B) {30} C) {50} D) {20}

9) $0.40x - 0.20(50 + x) = -0.04(50)$

A) {40} B) {30} C) {50} D) {20}

Find all values of x satisfying the given conditions.

10) $y_1 = 8x + 4(1 + x)$, $y_2 = 3(x - 4) + 10x$, and $y_1 = y_2$

A) {16} B) {5} C) {–16} D) {–5}

Find all values of x such that y = 0.

11) $y = 2[2x - (3x - 4)] - 5(x - 4)$

A) {4} B) {–4} C) $\left\{\frac{12}{7}\right\}$ D) $\left\{-\frac{12}{7}\right\}$

2 Solve Linear Equations Containing Fractions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the equation.

1) $\frac{x}{6} = \frac{x}{8} + 5$

A) {120} B) {40} C) {30} D) {48}

2) $\frac{x}{3} = \frac{x}{4} + \frac{8}{3}$

A) {32} B) $\left\{-\frac{8}{3}\right\}$ C) 0 D) $\left\{\frac{1}{32}\right\}$

3) $52 - \frac{x}{5} = \frac{x}{8}$

A) {160} B) {338} C) $\left\{\frac{169}{10}\right\}$ D) {4}

4) $\frac{2x}{5} = \frac{x}{3} + 5$

A) {75} B) {–75} C) {150} D) {–150}

5) $\frac{7x}{3} - x = \frac{x}{27} - \frac{8}{9}$

A) $\left\{-\frac{24}{35}\right\}$ B) $\left\{\frac{24}{37}\right\}$ C) $\left\{-\frac{24}{37}\right\}$ D) $\left\{\frac{24}{35}\right\}$

6) $\frac{x+9}{6} = \frac{19}{15} - \frac{x-3}{5}$

A) {1} B) {16} C) {0} D) {38}

7) $\frac{x+18}{6} + \frac{x+9}{9} = x - 3$

A) $\left\{\frac{126}{13}\right\}$ B) $\left\{\frac{18}{13}\right\}$ C) $\left\{\frac{90}{13}\right\}$ D) $\left\{-\frac{18}{13}\right\}$

Find all values of x satisfying the given conditions.

8) $y_1 = \frac{x+6}{5}$, $y_2 = \frac{x+8}{7}$, and $y_1 = y_2$

A) {–1} B) {1} C) {–2} D) {2}

Find all values of x such that y = 0.

9) $y = \frac{x+4}{5} + \frac{x-2}{4} - \frac{3}{4}$

A) {1} B) $\left\{\frac{13}{2}\right\}$ C) {0} D) {15}

3 Solve Rational Equations with Variables in the Denominators

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

First, write the value(s) that make the denominator(s) zero. Then solve the equation.

1) $\frac{7}{x} = \frac{1}{2x} + 26$

A) $x \neq 0$; $\left\{\frac{1}{4}\right\}$ B) $x \neq 0$; {4} C) $x \neq 0, 2$; $\left\{\frac{15}{26}\right\}$ D) No restrictions; {2}

2) $\frac{7}{x} + 9 = \frac{5}{2x} + \frac{10}{3}$

A) $x \neq 0$; $\left\{-\frac{27}{34}\right\}$ B) $x \neq 0$; $\left\{-\frac{34}{27}\right\}$

C) $x \neq 0, 2, 3$; $\left\{-\frac{27}{34}\right\}$ D) No restrictions; $\left\{-\frac{34}{27}\right\}$

3) $\frac{x-8}{2x}+4=\frac{x+3}{x}$

A) $x \neq 0; \{2\}$ B) $x \neq 0; \{-10\}$

C) $x \neq 0, 2; \{2\}$ D) No restrictions; $\left\{\frac{11}{8}\right\}$

4) $\frac{18}{x-6}+2=\frac{6}{x-6}$

A) $x \neq 6; \{0\}$ B) $x \neq -6; \{0\}$ C) $x \neq -6; \{18\}$ D) $x \neq 6; \emptyset$

5) $\frac{16}{8x-8}+\frac{1}{8}=\frac{2}{x-1}$

A) $x \neq 1; \emptyset$ B) $x \neq 8; \{1\}$ C) $x \neq 1; \{1\}$ D) $x \neq -1, 8; \{1, 8\}$

6) $\frac{1}{x+2}+\frac{3}{x-2}=\frac{12}{(x+2)(x-2)}$

A) $x \neq -2, 2; \emptyset$ B) $x \neq -2, 2; \{3\}$ C) $x \neq -2; \{2\}$ D) No restrictions; $\{2\}$

Solve the equation.

7) $\frac{x}{2x+2}=\frac{-2x}{4x+4}+\frac{2x-3}{x+1}$

A) $\{3\}$ B) $\left\{\frac{3}{2}\right\}$ C) $\{-3\}$ D) $\left\{-\frac{12}{5}\right\}$

8) $\frac{9}{y+2}-\frac{3}{y-2}=\frac{12}{y^2-4}$

A) $\{6\}$ B) $\{-6\}$ C) $\{\sqrt{19}\}$ D) $\{36\}$

9) $\frac{1}{x+6}+\frac{3}{x+4}=\frac{-2}{x^2+10x+24}$

A) $\emptyset$ B) $\{-6\}$ C) $\{4\}$ D) $\{0\}$

10) $\frac{m+4}{m^2+9m+20}-\frac{4}{m^2+10m+25}=\frac{m-4}{m^2+9m+20}$

A) $\{-6\}$ B) $\{-24\}$ C) $\{6\}$ D) $\{12\}$

Find all values of x satisfying the given conditions.

11) $y_1=\frac{1}{x+7}$, $y_2=\frac{3}{x+4}$, $y_3=\frac{-3}{x^2+11x+28}$, and $y_1+y_2=y_3$

A) $\{0\}$ B) $\{-7\}$ C) $\{4\}$ D) $\emptyset$

12) $y_1=\frac{2}{x+3}$, $y_2=\frac{5}{x-3}$, $y_3=\frac{9}{x^2-9}$, and $y_1-y_2=y_3$

A) $\{-10\}$ B) $\{10\}$ C) $\{\sqrt{10}\}$ D) $\{30\}$

4 Recognize Identities, Conditional Equations, and Inconsistent Equations

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the equation is an identity, a conditional equation, or an inconsistent equation.

1) $3(4x + 28) = 12x + 84$

A) Identity B) Conditional equation C) Inconsistent equation

2) $5x + 4x = 8x$

A) Identity B) Conditional equation C) Inconsistent equation

3) $4(x + 1) + 54 = 9x - 5(x - 8)$

A) Identity B) Conditional equation C) Inconsistent equation

4) $7x + 7(-3x - 2) = -24 - 4x$

A) Identity B) Conditional equation C) Inconsistent equation

5) $18x + 11(x + 1) = 29(x + 1) - 18$

A) Identity B) Conditional equation C) Inconsistent equation

6) $3x + 1 - 4x + 8 = 3x - 4x + 6$

A) Identity B) Conditional equation C) Inconsistent equation

7) $\frac{7x}{x} = 7$

A) Identity B) Conditional equation C) Inconsistent equation

8) $\frac{6x}{x - 7} = \frac{42}{x - 7} + 8$

A) Identity B) Conditional equation C) Inconsistent equation

9) $\frac{-2x + 7}{4} + \frac{5}{4} = -\frac{3x}{2}$

A) Identity B) Conditional equation C) Inconsistent equation

10) $\frac{1}{y + 5} - \frac{4}{y - 5} = \frac{8}{y^2 - 25}$

A) Identity B) Conditional equation C) Inconsistent equation

11) $\frac{1}{x + 4} + \frac{2}{x + 3} = \frac{-1}{x^2 + 7x + 12}$

A) Identity B) Conditional equation C) Inconsistent equation

5 Solve Applied Problems Using Mathematical Models

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

1) There is a relationship between the expected number of tickets sold for a raffle and the dollar value of the prize for the raffle. The equation $T - 9P = 50$ describes this relationship, where T is the expected number of tickets sold, and P is the dollar value of the raffle prize. Suppose the expected ticket sales for a certain raffle are 3650. Substitute 3650 into the equation to determine the dollar value of the raffle prize.

A) \$400 B) \$32,900 C) \$350 D) \$3600

2) The equation $V = -2000t + 24{,}000$ describes the value in dollars of a certain model of car after it is t years old. If a car is worth \$18,000, substitute 18,000 into the equation to find the age of the car.

A) 3 years B) 2 years C) 4 years D) 5 years

3) A certain store has a fax machine available for use by its customers. The store charges \$2.50 to send the first page and \$0.45 for each subsequent page. The total price, P, for the faxing x pages can be modeled by the formula $P = 0.45(x - 1) + 2.50$. Determine the number of pages that can be faxed for \$3.85.

A) 4 pages B) 53 pages C) 2 pages D) 9 pages

4) A local race for charity has taken place since 1993. Using the actual speeds of the winners from 1993 through 1998, mathematicians obtained the formula $y = 0.18x + 5.5$, in which x represents the number of years after 1993 and y represents the winning speed in miles per hour. In what year is the winning speed predicted to be 7.48 mph?

A) 2004 B) 2003 C) 2005 D) 2006

5) A car rental agency charges \$250 per week plus \$0.10 per mile to rent a car. The total cost, C, for the renting the car for one week and driving it x miles can be modeled by the formula $C = 0.10x + 250$. How many miles can you travel in one week for \$330?

A) 800 miles B) 775 miles C) 283 miles D) 3300 miles

6) The formula $y = \dfrac{22{,}000 + 200x}{x}$ models the average cost per unit, y, for Electrostuff to manufacture x units of Electrogadget IV. How many units must the company produce to have an average cost per unit of \$300?

A) 220 units B) 222 units C) 200 units D) 110 units

7) Suppose a cost–benefit model is given by $y = \dfrac{2629x}{100 - x}$, where y is the cost for removing x percent of a given pollutant. What percent of pollutant can be removed for \$25,000? Round your answer to the nearest tenth of a percent.

A) 90.5% B) 111.8% C) 9.0% D) 487.4%

8) The U.S. Maritime Administration estimated that the cost per ton of building an oil tanker could be represented by the model $y = \dfrac{102{,}000}{x + 235}$, where y is the cost in dollars per ton and x is the tons (in thousands). What size of oil tanker (in thousands of tons) can be built for \$350 per ton?

A) 56 thousand tons B) 174 thousand tons C) 526 thousand tons D) 6 thousand tons

1.3 Models and Applications

1 Use Linear Equations to Solve Problems

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use the five–step strategy for solving word problems to find the number or numbers described in the following exercise.

1) When four times the number is added to 9 times the number, the result is 65. What is the number?

A) 5 B) –7.2 C) 7.2 D) 0.6

2) When 3 times a number is subtracted from 7 times the number, the result is 44. What is the number?

A) 11 B) 4 C) –11 D) 2

3) When a number is decreased by 25% of itself, the result is 216. What is the number?

A) 288 B) 9 C) 1152 D) 72

4) When 10% of a number is added to the number, the result is 143. What is the number?

A) 130 B) 13 C) 9 D) 110

5) 20% of what number is 58?

A) 290 B) 2900 C) 29 D) 11.6

6) One number exceeds another by –4. The sum of the numbers is 10. What are the numbers?

A) 3 and 7 B) 2 and 8 C) –3 and 8 D) No solution

Find all values of x satisfying the given conditions.

7) $y_1 = 9x$, $y_2 = (5x - 1)$, and y_1 exceeds y_2 by 2.

A) $\left\{\frac{1}{4}\right\}$ B) $\left\{\frac{1}{14}\right\}$ C) $\left\{-\frac{1}{4}\right\}$ D) $\left\{-\frac{1}{14}\right\}$

8) $y_1 = x$, $y_2 = 9 + x$, $y_3 = 3(x - 8) + 10x$, and the sum of 8 times y_1 and 4 times y_2 equals y_3.

A) {60} B) {17} C) {–60} D) {–17}

9) $y_1 = \frac{1}{x + 6}$, $y_2 = \frac{1}{x + 3}$, $y_3 = \frac{-3}{x^2 + 9x + 18}$, and the sum of y_1 and 2 times y_2 is y_3.

A) {0} B) {–6} C) {3} D) ∅

10) $y_1 = \frac{1}{x + 5}$, $y_2 = \frac{1}{x - 5}$, $y_3 = \frac{1}{x^2 - 25}$, and the difference between 5 times y_1 and 7 times y_2 is the product of 2 and y_3.

A) {–31} B) {31} C) $\{\sqrt{58}\}$ D) {62}

Solve the problem.

11) A car rental agency charges $150 per week plus $0.20 per mile to rent a car. How many miles can you travel in one week for $250?

A) 500 miles B) 475 miles C) 200 miles D) 1250 miles

12) A train ticket in a certain city is $1.50. People who use the train also have the option of purchasing a frequent rider pass for $17.25 each month. With the pass, each ticket costs only $0.75. Determine the number of times in a month the train must be used so that the total monthly cost without the pass is the same as the total monthly cost with the pass.

A) 23 times B) 24 times C) 22 times D) 25 times

13) You inherit $10,000 with the stipulation that for the first year the money must be invested in two stocks paying 6% and 11% annual interest, respectively. How much should be invested at each rate if the total interest earned for the year is to be $700?

A) $8000 invested at 6%; $2000 invested at 11%

B) $2000 invested at 6%; $8000 invested at 11%

C) $7000 invested at 6%; $3000 invested at 11%

D) $9000 invested at 6%; $1000 invested at 11%

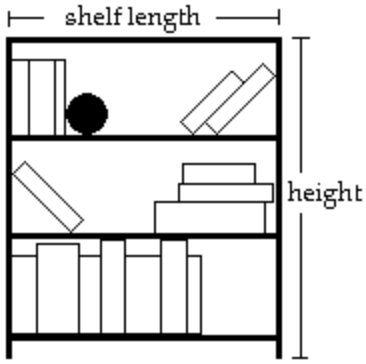
14) You inherit $70,000 from a very wealthy grandparent, with the stipulation that for the first year, the money must be invested in two stocks paying 4% and 10% annual interest, respectively. How much should be invested at each rate if the total interest earned for the year is to be $4000?

A) $50,000 invested at 4%; $20,000 invested at 10%

B) $20,000 invested at 4%; $50,000 invested at 10%

C) $40,000 invested at 4%; $30,000 invested at 10%

15) A bookcase is to be constructed as shown in the figure below. The height of the bookcase is 3 feet longer than the length of a shelf. If 18 feet of lumber is available for the entire unit (including the shelves, but NOT the back of the bookcase), find the length and height of the unit.



A) length = 2 feet; height = 5 feet

B) length = 7.5 feet; height = 9.0 feet

C) length = 3 feet; height = 6 feet

D) length = 2 feet; height = 6 feet

16) An auto repair shop charged a customer $339 to repair a car. The bill listed $99 for parts and the remainder for labor. If the cost of labor is $40 per hour, how many hours of labor did it take to repair the car?

A) 6 hours B) 5 hours C) 7 hours D) 6.5 hours

17) After a 14% price reduction, a boat sold for $28,380. What was the boat's price before the reduction? (Round to the nearest cent, if necessary.)

A) $33,000 B) $3973.20 C) $202,714.29 D) $32,353.20

18) Inclusive of a 7.7% sales tax, a diamond ring sold for $2261.70. Find the price of the ring before the tax was added. (Round to the nearest cent, if necessary.)

A) $2100 B) $2435.85 C) $2087.55 D) $174.15

19) The length of a rectangular room is 6 feet longer than twice the width. If the room's perimeter is 144 feet, what are the room's dimensions?

A) Width = 22 ft; length = 50 ft B) Width = 44 ft; length = 100 ft

C) Width = 33 ft; length = 39 ft D) Width = 27 ft; length = 60 ft

20) There are 14 more sophomores than juniors in an 8 AM algebra class. If there are 108 students in this class, find the number of sophomores and the number of juniors in the class.

A) 61 sophomores; 47 juniors B) 47 sophomores; 61 juniors

C) 122 sophomores; 94 juniors D) 108 sophomores; 94 juniors

21) The president of a certain university makes three times as much money as one of the department heads. If the total of their salaries is $220,000, find each worker's salary.

A) president's salary = $165,000; department head's salary = $55,000

B) president's salary = $55,000; department head's salary = $165,000

C) president's salary = $16,500; department head's salary = $5500

D) president's salary = $110,000; department head's salary = $55,000

22) During a road trip, Tony drove one–third the distance that Lana drove. Mark drives 18 more miles than Lana drove. The total distance they drove on the trip was 298 miles. How many miles did each person drive?

A) Tony drove 40 miles, Lana drove 120 miles, and Mark drove 138 miles.

B) Tony drove 120 miles, Lana drove 360 miles, and Mark drove 378 miles.

C) Tony drove 34 miles, Lana drove 102 miles, and Mark drove 120 miles.

D) Tony drove 360 miles, Lana drove 120 miles, and Mark drove 102 miles.

23) The sum of the angles of a triangle is 180°. Find the three angles of the triangle if one angle is four times the smallest angle and the third angle is 36° greater than the smallest angle.

A) 24°, 96°, 60° B) 16°, 64°, 100° C) 0°, 0°, 180° D) 0°, 36°, 144°

24) In a recent International Gymnastics competition, the U.S., China, and Romania were the big winners. If the total number of medals won by each team are three consecutive integers whose sum is 48 and the U.S. won more than China who won more than Romania, how many medals did each team win?

A) U.S.: 17 medals; China: 16 medals; Romania: 15 medals

B) U.S.: 18 medals; China: 17 medals; Romania: 16 medals

C) U.S.: 50 medals; China: 49 medals; Romania: 48 medals

D) U.S.: 15 medals; China: 14 medals; Romania: 13 medals

25) Andrea is having her yard landscaped. She obtained an estimate from two landscaping companies. Company A gave an estimate of $220 for materials and equipment rental plus $65 per hour for labor. Company B gave an estimate of $300 for materials and equipment rental plus $55 per hour for labor. Determine how many hours of labor will be required for the two companies to cost the same.

A) 8 hours B) 7 hours C) 11 hours D) 12 hours

26) Sergio's internet provider charges its customers $13 per month plus 5¢ per minute of on–line usage. Sergio received a bill from the provider covering a 2–month period and was charged a total of $47.50. How many minutes did he spend on–line during that period? (Round to the nearest whole minute, if necessary.)

A) The number of minutes is 430. B) The number of minutes is 303.

C) The number of minutes is 523. D) The number of minutes is 43.

2 Solve a Formula for a Variable

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the formula for the specified variable.

1) $A = \frac{1}{2}bh$ for b

A) $b = \frac{2A}{h}$ B) $b = \frac{h}{2A}$ C) $b = \frac{Ah}{2}$ D) $b = \frac{A}{2h}$

2) $S = 2\pi rh + 2\pi r^2$ for h

A) $h = \frac{S - 2\pi r^2}{2\pi r}$ B) $h = S - r$ C) $h = \frac{S}{2\pi r} - 1$ D) $h = 2\pi(S - r)$

3) $V = \frac{1}{3}Bh$ for h

A) $h = \frac{3V}{B}$ B) $h = \frac{3B}{V}$ C) $h = \frac{V}{3B}$ D) $h = \frac{B}{3V}$

4) $F = \frac{9}{5}C + 32$ for C

A) $C = \frac{5}{9}(F - 32)$ B) $C = \frac{9}{5}(F - 32)$ C) $C = \frac{F - 32}{9}$ D) $C = \frac{5}{F - 32}$

5) $A = \frac{1}{2}h(a + b)$ for a

A) $a = \frac{2A - hb}{h}$ B) $a = \frac{hb - 2A}{h}$ C) $a = \frac{2Ab - h}{h}$ D) $a = \frac{A - hb}{2h}$

6) $d = rt$ for r

A) $r = \frac{d}{t}$ B) $r = dt$ C) $r = \frac{t}{d}$ D) $r = d - t$

7) $P = 2L + 2W$ for W

A) $W = \frac{P - 2L}{2}$ B) $W = P - L$ C) $W = \frac{P - L}{2}$ D) $W = P - 2L$

8) $A = P(1 + nr)$ for n

A) $n = \frac{A - P}{Pr}$ B) $n = \frac{P - A}{Pr}$ C) $n = \frac{A}{r}$ D) $n = \frac{Pr}{A - P}$

9) $I = Prt$ for t

A) $t = \frac{I}{Pr}$ B) $t = \frac{P - I}{1 + r}$ C) $t = P - Ir$ D) $t = \frac{P - 1}{Ir}$

10) $\frac{1}{a} + \frac{1}{b} = \frac{1}{c}$ for c

A) $c = \frac{ab}{a + b}$ B) $c = \frac{a + b}{ab}$ C) $c = a + b$ D) $c = ab(a + b)$

11) $P = \frac{A}{1 + rt}$ for r

A) $r = \frac{A - P}{Pt}$ B) $r = \frac{P - A}{1 + t}$ C) $r = P - At$ D) $r = \frac{P - 1}{At}$

12) $A = \frac{1}{2}h(B + b)$ for B

A) $B = \frac{2A - bh}{h}$ B) $B = 2A - bh$ C) $B = \frac{A - bh}{h}$ D) $B = \frac{2A + bh}{h}$

13) $P = s_1 + s_2 + s_3$ for s_2

A) $s_2 = P - s_1 - s_3$ B) $s_2 = P + s_1 + s_3$ C) $s_2 = s_1 + s_3 - P$ D) $s_2 = P + s_1 - s_3$

14) $I = \frac{nE}{nr + R}$ for n

A) $n = \frac{IR}{E - Ir}$ B) $n = \frac{IR}{Ir + E}$ C) $n = IR(Ir - E)$ D) $n = \frac{-R}{Ir - E}$

1.4 Complex Numbers

1 Add and Subtract Complex Numbers

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Add or subtract as indicated and write the result in standard form.

1) $(3 - 9i) + (2 + 5i)$

A) $5 - 4i$ B) $5 + 4i$ C) $1 + 14i$ D) $-5 + 4i$

2) $(9 + 8i) - (-7 + i)$

A) $16 + 7i$ B) $16 - 7i$ C) $2 + 9i$ D) $-16 - 7i$

3) $7i + (-5 - i)$

A) $-5 + 6i$ B) $-5 + 8i$ C) $5 - 6i$ D) $5 - 8i$

4) $3i - (-8 - i)$

A) $8 + 4i$ B) $-8 - 4i$ C) $8 - 2i$ D) $-8 + 2i$

5) $(-5 + 9i) - 7$

A) $-12 + 9i$ B) $12 - 9i$ C) $2 + 9i$ D) $2 - 9i$

6) $-7 - (-2 - 7i) - (-2 + 5i)$

A) $-3 + 2i$ B) $-3 - 2i$ C) $4 - 2i$ D) $4 + 2i$

7) $(-3 - 4i) + (-5 + 7i) + (3 + 7i)$

A) $-5 + 10i$ B) $5 - 4i$ C) $-11 - 4i$ D) $-8 + 3i$

2 Multiply Complex Numbers

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the product and write the result in standard form.

1) $-6i(5i - 3)$

A) $30 + 18i$ B) $-30 + 18i$ C) $18i - 30i^2$ D) $18i + 30i^2$

2) $3i(-6i + 3)$

A) $18 + 9i$ B) $-18 + 9i$ C) $9i - 18i^2$ D) $9i + 18i^2$

3) $(3 + 3i)(5 - 6i)$

A) $33 - 3i$ B) $33 + 3i$ C) $-3 + 33i$ D) $-18i^2 - 3i + 15$

4) $(-3 - 7i)(2 + i)$

A) $1 - 17i$ B) $-13 - 17i$ C) $1 + 11i$ D) $-13 + 11i$

5) $(4 - 3i)(-5 - 6i)$

A) $-38 - 9i$ B) $-38 - 39i$ C) $-2 - 9i$ D) $-2 - 39i$

6) $(1 + 5i)(1 - 5i)$

A) 26 B) $1 - 25i^2$ C) -24 D) $1 - 25i$

7) $(-6 + i)(-6 - i)$

A) 37 B) -6 C) 36 D) -35

8) $(5 - 7i)^2$

A) $-24 - 70i$ B) $74 - 70i$ C) -24 D) $25 - 70i + 49i^2$

Perform the indicated operations and write the result in standard form.

9) $(4 + 5i)(4 - i) - (1 - i)(1 + i)$

A) $19 + 16i$ B) $23 + 16i$ C) $21 + 16i$ D) $19 + 24i$

10) $(3 + i)^2 - (2 - i)^2$

A) 5 + 10i B) −5 + 10i C) −5 D) 5 − 10i

Complex numbers are used in electronics to describe the current in an electric circuit. Ohm's law relates the current in a circuit, I, in amperes, the voltage of the circuit, E, in volts, and the resistance of the circuit, R, in ohms, by the formula E = IR. Solve the problem using this formula.

11) Find E, the voltage of a circuit, if I = (9 + 3i) amperes and R = (6 + 7i) ohms.

A) (33 + 81i) volts B) (33 − 81i) volts C) (81 + 33i) volts D) (81 − 33i) volts

12) Find E, the voltage of a circuit, if I = (18 + i) amperes and R = (3 + 2i) ohms.

A) (52 + 39i) volts B) (52 − 39i) volts C) (18 + 39i) volts D) (18 − 39i) volts

3 Divide Complex Numbers

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Divide and express the result in standard form.

1) $\frac{9}{7 - i}$

A) $\frac{63}{50} + \frac{9}{50}i$ B) $\frac{63}{50} - \frac{9}{50}i$ C) $\frac{21}{16} + \frac{3}{16}i$ D) $\frac{21}{16} - \frac{3}{16}i$

2) $\frac{8}{4 + i}$

A) $\frac{32}{17} - \frac{8}{17}i$ B) $\frac{32}{17} + \frac{8}{17}i$ C) $\frac{32}{15} + \frac{8}{15}i$ D) $\frac{32}{15} - \frac{8}{15}i$

3) $\frac{5i}{2 + i}$

A) 1 + 2i B) −1 + 2i C) 1 + 5i D) 1 − 2i

4) $\frac{6i}{4 + i}$

A) $\frac{6}{17} + \frac{24}{17}i$ B) $-\frac{6}{17} + \frac{24}{17}i$ C) $\frac{2}{5} + \frac{8}{5}i$ D) $\frac{6}{17} - \frac{24}{17}i$

5) $\frac{4i}{2 + 3i}$

A) $\frac{12}{13} + \frac{8}{13}i$ B) $\frac{8}{13} + \frac{12}{13}i$ C) $-\frac{12}{5} + \frac{8}{5}i$ D) $-\frac{8}{5} - \frac{12}{5}i$

6) $\frac{6 + 5i}{5 - 6i}$

A) i B) −i C) 1 D) −1

7) $\frac{6 - 6i}{8 + 2i}$

A) $\frac{9}{17} - \frac{15}{17}i$ B) $\frac{3}{20} - \frac{1}{4}i$ C) $\frac{60}{17} + \frac{36}{17}i$ D) $1 - \frac{1}{4}i$

8) $\frac{9 + 8i}{9 - 4i}$

A) $\frac{49}{97} + \frac{108}{97}i$ B) $\frac{49}{65} + \frac{108}{65}i$ C) $\frac{113}{97} - \frac{36}{97}i$ D) $\frac{113}{65} + \frac{108}{65}i$

9) $\frac{4 + 3i}{5 + 3i}$

A) $\frac{29}{34} + \frac{3}{34}i$ B) $\frac{29}{16} + \frac{3}{16}i$ C) $\frac{11}{34} - \frac{27}{34}i$ D) $\frac{11}{16} + \frac{3}{16}i$

10) $\frac{6 + 8i}{5 + 4i}$

A) $\frac{62}{41} + \frac{16}{41}i$ B) $\frac{62}{9} + \frac{16}{9}i$ C) $-\frac{2}{41} - \frac{64}{41}i$ D) $-\frac{2}{9} + \frac{16}{9}i$

11) $\frac{2 - 6i}{5 - 7i}$

A) $\frac{26}{37} - \frac{8}{37}i$ B) $-\frac{13}{12} + \frac{1}{3}i$ C) $-\frac{32}{37} + \frac{44}{37}i$ D) $\frac{4}{3} + \frac{1}{3}i$

4 Perform Operations with Square Roots of Negative Numbers

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Perform the indicated operations and write the result in standard form.

1) $\sqrt{-16} + \sqrt{-81}$

A) 13i B) –13i C) 36i D) –13

2) $\sqrt{-2} - \sqrt{-144}$

A) $i(\sqrt{2} - 12)$ B) $\sqrt{2}i - 12$ C) $\sqrt{2i} - 12i$ D) $i(\sqrt{2} + 12)$

3) $5\sqrt{-16} + 4\sqrt{-81}$

A) 56i B) –56 C) 56 D) –56i

4) $3\sqrt{-75} + 5\sqrt{-48}$

A) $35i\sqrt{3}$ B) $-35\sqrt{3}$ C) $35\sqrt{3}$ D) $-35i\sqrt{3}$

5) $(-2 - \sqrt{-36})^2$

A) –32 + 24i B) 40 – 24i C) 4 + 36i D) 4 – 36i

6) $(-5 + \sqrt{-64})^2$

A) –39 – 80i B) 89 – 80i C) 25 + 64i D) 25 – 64i

7) $(\sqrt{6} - \sqrt{-9})(\sqrt{6} + \sqrt{-9})$

A) 15 B) –3 C) 6 – 9i D) 6 + 3i

8) $(5 + \sqrt{-2})(4 + \sqrt{-3})$

A) $(20 - \sqrt{6}) + (5\sqrt{3} + 4\sqrt{2})i$ B) $(20 + \sqrt{6}) - 26i$

C) $14 - 9\sqrt{6}i$ D) $26 + 54i$

9) $\dfrac{-12 + \sqrt{-45}}{3}$

A) $-4 + i\sqrt{5}$ B) $-4 - i\sqrt{5}$ C) $4 + i\sqrt{5}$ D) $-4 + i\sqrt{3}$

10) $\dfrac{-2 - \sqrt{-24}}{2}$

A) $-1 - i\sqrt{6}$ B) $-1 + i\sqrt{6}$ C) $1 + i\sqrt{6}$ D) $-1 - i\sqrt{2}$

11) $\sqrt{-64}(5 - \sqrt{-36})$

A) $48 + 40i$ B) $40i - 48$ C) $40i - 48i^2$ D) $40i + 48i^2$

12) $(\sqrt{-49})(\sqrt{-100})$

A) -70 B) $70i^2$ C) 70 D) $-70i$

1.5 Quadratic Equations

1 Solve Quadratic Equations by Factoring

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the equation by factoring.

1) $x^2 = x + 6$

A) $\{-2, 3\}$ B) $\{2, 3\}$ C) $\{1, 6\}$ D) $\{-2, -3\}$

2) $x^2 + 2x - 120 = 0$

A) $\{-12, 10\}$ B) $\{12, 10\}$ C) $\{-12, 1\}$ D) $\{12, -10\}$

3) $15x^2 + 26x + 8 = 0$

A) $\left\{-\frac{4}{3}, -\frac{2}{5}\right\}$ B) $\left\{\frac{4}{3}, \frac{2}{5}\right\}$ C) $\left\{-\frac{4}{15}, -\frac{1}{4}\right\}$ D) $\left\{\frac{4}{3}, -\frac{2}{5}\right\}$

4) $2x^2 - 15x = 8$

A) $\left\{-\frac{1}{2}, 8\right\}$ B) $\left\{-\frac{1}{2}, 2\right\}$ C) $\left\{\frac{1}{15}, -\frac{1}{2}\right\}$ D) $\{-2, 8\}$

5) $11x^2 - 9x = 0$

A) $\left\{0, \frac{9}{11}\right\}$ B) $\left\{\frac{9}{11}, -\frac{9}{11}\right\}$ C) $\{0\}$ D) $\left\{-\frac{9}{11}, 0\right\}$

6) $3x(x - 5) = 7x^2 - 16x$

A) $\left\{0, \frac{1}{4}\right\}$ B) $\left\{-\frac{1}{4}, 0\right\}$ C) $\{0, 4\}$ D) $\{0\}$

7) $7 - 7x = (4x + 9)(x - 1)$

A) $\{-4, 1\}$ B) $\left\{1, -\frac{9}{4}\right\}$ C) $\{-1, 4\}$ D) $\{1\}$

8) $-6x - 2 = (3x + 1)^2$

A) $\left\{-1, -\frac{1}{3}\right\}$ B) $\left\{-\frac{1}{3}\right\}$ C) $\left\{\frac{1}{3}, 1\right\}$ D) $\varnothing$

2 Solve Quadratic Equations by the Square Root Property

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the equation by the square root property.

1) $6x^2 = 54$

A) $\{-3, 3\}$ B) $\{-3\sqrt{6}, 3\sqrt{6}\}$ C) $\{-6, 6\}$ D) $\{0\}$

2) $3x^2 = 21$

A) $\{-\sqrt{7}, \sqrt{7}\}$ B) $\{8\}$ C) $\{-7, 7\}$ D) $\{10.5\}$

3) $8x^2 + 4 = 76$

A) $\{-3, 3\}$ B) $\{3\}$ C) $\{-4, 4\}$ D) $\{38\}$

4) $(x - 3)^2 = 49$

A) $\{-4, 10\}$ B) $\{52\}$ C) $\{-7, 7\}$ D) $\{-10, -4\}$

5) $(2x - 5)^2 = 25$

A) $\{0, 5\}$ B) $\{-5, 0\}$ C) $\{0, 10\}$ D) $\{-10, 0\}$

6) $(3x + 3)^2 = 36$

A) $\{-3, 1\}$ B) $\{1, 3\}$ C) $\{-13, 13\}$ D) $\{0, 1\}$

7) $2(x - 6)^2 = 10$

A) $\{6 \pm \sqrt{5}\}$ B) $\{1, 11\}$ C) $\{-6 \pm \sqrt{5}\}$ D) $\{-11, -1\}$

8) $(2x + 3)^2 = 5$

A) $\left\{\frac{-3 - \sqrt{5}}{2}, \frac{-3 + \sqrt{5}}{2}\right\}$ B) $\left\{\frac{3 - \sqrt{5}}{2}, \frac{3 + \sqrt{5}}{2}\right\}$

C) $\left\{\frac{\sqrt{5} - 3}{2}, \frac{\sqrt{5} + 3}{2}\right\}$ D) $\{-4, 1\}$

9) $(7x - 8)^2 = 12$

A) $\left\{\frac{8 - 2\sqrt{3}}{7}, \frac{8 + 2\sqrt{3}}{7}\right\}$ B) $\{-2\sqrt{7}, 2\sqrt{7}\}$

C) $\left\{\frac{-8 - 2\sqrt{3}}{7}, \frac{-8 + 2\sqrt{3}}{7}\right\}$ D) $\left\{-\frac{4}{7}, \frac{20}{7}\right\}$

10) $(x - 10)^2 = -121$

A) $\{10 \pm 11i\}$ B) $\left\{\pm \frac{11i}{10}\right\}$ C) $\{-10 \pm 11i\}$ D) $\{10i \pm 11\}$

11) $(x - 6)^2 = -5$

A) $\{6 \pm i\sqrt{5}\}$ B) $\{6 \pm \sqrt{5}\}$ C) $\{-6 \pm 5i\}$ D) $\{1, 11\}$

3 Solve Quadratic Equations by Completing the Square

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine the constant that should be added to the binomial so that it becomes a perfect square trinomial. Then write and factor the trinomial.

1) $x^2 + 18x$

A) $81; x^2 + 18x + 81 = (x + 9)^2$ B) $9; x^2 + 18x + 9 = (x + 81)^2$

C) $324; x^2 + 18x + 324 = (x + 18)^2$ D) $18; x^2 + 18x + 18 = (x + 324)^2$

2) $x^2 - 14x$

A) $49; x^2 - 14x + 49 = (x - 7)^2$ B) $-49; x^2 - 14x - 49 = (x - 7)^2$

C) $-196; x^2 - 14x - 196 = (x - 14)^2$ D) $196; x^2 - 14x + 196 = (x - 14)^2$

3) $x^2 - 15x$

A) $\frac{225}{4}; x^2 - 15x + \frac{225}{4} = \left(x - \frac{15}{2}\right)^2$ B) $-\frac{225}{4}; x^2 - 15x - \frac{225}{4} = \left(x - \frac{15}{2}\right)^2$

C) $\frac{15}{2}; x^2 - 15x + \frac{15}{2} = \left(x - \frac{15}{2}\right)^2$ D) $225; x^2 - 15x + 225 = (x - 15)^2$

4) $x^2 + \frac{1}{6}x$

A) $\frac{1}{144}; x^2 + \frac{1}{6}x + \frac{1}{144} = \left(x + \frac{1}{12}\right)^2$ B) $\frac{1}{36}; x^2 + \frac{1}{6}x + \frac{1}{36} = \left(x + \frac{1}{6}\right)^2$

C) $\frac{1}{12}; x^2 + \frac{1}{6}x + \frac{1}{12} = \left(x + \frac{1}{6}\right)^2$ D) $144; x^2 + \frac{1}{6}x + 144 = (x + 12)^2$

5) $x^2 + \frac{4}{9}x$

A) $\frac{4}{81}; x^2 + \frac{4}{9}x + \frac{4}{81} = \left(x + \frac{2}{9}\right)^2$ B) $\frac{8}{81}; x^2 + \frac{4}{9}x + \frac{8}{81} = \left(x + \frac{4}{9}\right)^2$

C) $\frac{4}{9}; x^2 + \frac{4}{9}x + \frac{4}{9} = \left(x + \frac{2}{9}\right)^2$ D) $\frac{2}{81}; x^2 + \frac{4}{9}x + \frac{2}{81} = \left(x + \frac{2}{9}\right)^2$

6) $x^2 - \frac{2}{9}x$

A) $\frac{1}{81}; x^2 - \frac{2}{9}x + \frac{1}{81} = \left(x - \frac{1}{9}\right)^2$ B) $\frac{1}{81}; x^2 - \frac{2}{9}x + \frac{1}{81} = \left(x + \frac{1}{9}\right)^2$

C) $\frac{4}{81}; x^2 - \frac{2}{9}x + \frac{4}{81} = \left(x - \frac{2}{9}\right)^2$ D) $\frac{2}{81}; x^2 - \frac{2}{9}x + \frac{2}{81} = \left(x - \frac{1}{9}\right)^2$

Solve the equation by completing the square.

7) $x^2 + 4x = 7$

A) $\{-2 - \sqrt{5.5}, -2 + \sqrt{5.5}\}$

B) $\{2 + \sqrt{5.5}\}$

C) $\{-1 - \sqrt{5.5}, -1 + \sqrt{5.5}\}$

D) $\{-2 - 1\sqrt{5.5}, -2 + 1\sqrt{5.5}\}$

8) $x^2 + 8x + 7 = 0$

A) $\{-7, -1\}$ B) $\{1, 7\}$ C) $\{-\sqrt{7}, \sqrt{7}\}$ D) $\{-7, 14\}$

9) $x^2 + 12x + 21 = 0$

A) $\{-6 - \sqrt{15}, -6 + \sqrt{15}\}$

B) $\{6 + \sqrt{15}\}$

C) $\{6 - \sqrt{21}, 6 + \sqrt{21}\}$

D) $\{-12 + \sqrt{21}\}$

10) $x^2 + 4x - 9 = 0$

A) $\{-2 - \sqrt{13}, -2 + \sqrt{13}\}$

B) $\{2 + \sqrt{13}\}$

C) $\{-1 - \sqrt{13}, -1 + \sqrt{13}\}$

D) $\{-2 - 1\sqrt{13}, -2 + 1\sqrt{13}\}$

11) $x^2 - 12x - 7 = 0$

A) $\{6 - \sqrt{43}, 6 + \sqrt{43}\}$

B) $\{6 - \sqrt{7}, 6 + \sqrt{7}\}$

C) $\{-6 - \sqrt{43}, -6 + \sqrt{43}\}$

D) $\{12 - \sqrt{151}, 12 + \sqrt{151}\}$

12) $x^2 + 3x - 9 = 0$

A) $\left\{\frac{-3 - 3\sqrt{5}}{2}, \frac{-3 + 3\sqrt{5}}{2}\right\}$

B) $\left\{\frac{3 + 3\sqrt{5}}{2}\right\}$

C) $\left\{\frac{-3 - 3\sqrt{5}}{2}\right\}$

D) $\{-3 - 3\sqrt{5}, -3 + 3\sqrt{5}\}$

13) $x^2 - 8x + 32 = 0$

A) $\{4 \pm 4i\}$ B) $\{4 \pm 16i\}$ C) $\{4 + 4i\}$ D) $\{8, 0\}$

14) $x^2 + x + 7 = 0$

A) $\left\{\frac{-1 \pm 3i\sqrt{3}}{2}\right\}$ B) $\left\{\frac{1 \pm 3i\sqrt{3}}{2}\right\}$ C) $\left\{\frac{1 \pm 3\sqrt{3}}{2}\right\}$ D) $\left\{\frac{-1 \pm 3\sqrt{3}}{2}\right\}$

15) $5x^2 - 2x - 2 = 0$

A) $\left\{\frac{1 - \sqrt{11}}{5}, \frac{1 + \sqrt{11}}{5}\right\}$

B) $\left\{\frac{5 - \sqrt{11}}{25}, \frac{5 + \sqrt{11}}{25}\right\}$

C) $\left\{-2, \frac{12}{5}\right\}$

D) $\left\{\frac{-1 - \sqrt{11}}{5}, \frac{-1 + \sqrt{11}}{5}\right\}$

16) $8x^2 - 5x + 1 = 0$

A) $\left\{\frac{5 \pm i\sqrt{7}}{16}\right\}$

B) $\left\{\frac{-5 \pm i\sqrt{7}}{16}\right\}$

C) $\left\{\frac{5 - i\sqrt{7}}{16}, \frac{-5 + i\sqrt{7}}{16}\right\}$

D) $\left\{\frac{5 \pm \sqrt{7}}{16}\right\}$

4 Solve Quadratic Equations Using the Quadratic Formula

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the equation using the quadratic formula.

1) $x^2 + 3x - 40 = 0$

A) {–8, 5}

B) {8, 5}

C) {–8, 1}

D) {–5, 8}

2) $x^2 + 7x + 7 = 0$

A) $\left\{\frac{-7 - \sqrt{21}}{2}, \frac{-7 + \sqrt{21}}{2}\right\}$

B) $\left\{\frac{7 - \sqrt{21}}{2}, \frac{7 + \sqrt{21}}{2}\right\}$

C) $\left\{\frac{-7 - \sqrt{21}}{14}, \frac{-7 + \sqrt{21}}{14}\right\}$

D) $\left\{\frac{-7 - \sqrt{77}}{2}, \frac{-7 + \sqrt{77}}{2}\right\}$

3) $3x^2 + 10x + 4 = 0$

A) $\left\{\frac{-5 - \sqrt{13}}{3}, \frac{-5 + \sqrt{13}}{3}\right\}$

B) $\left\{\frac{-5 - \sqrt{13}}{6}, \frac{-5 + \sqrt{13}}{6}\right\}$

C) $\left\{\frac{-10 - \sqrt{13}}{3}, \frac{-10 + \sqrt{13}}{3}\right\}$

D) $\left\{\frac{-5 - \sqrt{37}}{3}, \frac{-5 + \sqrt{37}}{3}\right\}$

4) $3x^2 + x - 7 = 0$

A) $\left\{\frac{-1 - \sqrt{85}}{6}, \frac{-1 + \sqrt{85}}{6}\right\}$

B) $\left\{\frac{-1 - \sqrt{85}}{2}, \frac{-1 + \sqrt{85}}{2}\right\}$

C) $\left\{\frac{1 - \sqrt{85}}{6}, \frac{1 + \sqrt{85}}{6}\right\}$

D) $\varnothing$

5) $6x^2 = -12x - 4$

A) $\left\{\frac{-3 - \sqrt{3}}{3}, \frac{-3 + \sqrt{3}}{3}\right\}$

B) $\left\{\frac{-3 - \sqrt{3}}{12}, \frac{-3 + \sqrt{3}}{12}\right\}$

C) $\left\{\frac{-12 - \sqrt{3}}{3}, \frac{-12 + \sqrt{3}}{3}\right\}$

D) $\left\{\frac{-3 - \sqrt{15}}{3}, \frac{-3 + \sqrt{15}}{3}\right\}$

6) $x^2 + 14x + 58 = 0$

A) {–7 + 3i, –7 – 3i}

B) {–7 – 9i, –7 + 9i}

C) {–7 + 3i}

D) {–4, –10}

7) $5x^2 - 3x + 3 = 0$

A) $\left\{\frac{3 \pm i\sqrt{51}}{10}\right\}$

B) $\left\{\frac{3 \pm \sqrt{51}}{10}\right\}$

C) $\left\{\frac{-3 \pm i\sqrt{51}}{10}\right\}$

D) $\left\{\frac{-3 \pm \sqrt{51}}{10}\right\}$

8) $8x^2 + 1 = 3x$

A) $\left\{\frac{3 \pm i\sqrt{23}}{16}\right\}$ B) $\left\{\frac{3 \pm \sqrt{23}}{16}\right\}$ C) $\left\{\frac{-3 \pm \sqrt{23}}{16}\right\}$ D) $\left\{\frac{-3 \pm i\sqrt{23}}{16}\right\}$

5 Use the Discriminant to Determine the Number and Type of Solutions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Compute the discriminant. Then determine the number and type of solutions for the given equation.

1) $x^2 + 4x + 3 = 0$

A) 4; two unequal real solutions

B) −28; two complex imaginary solutions

C) 0; one real solution

2) $x^2 + 12x + 36 = 0$

A) 0; one real solution

B) 144; two unequal real solutions

C) −144; two complex imaginary solutions

3) $7x^2 = -6x - 2$

A) −20; two complex imaginary solutions

B) 92; two unequal real solutions

C) 0; one real solution

6 Determine the Most Efficient Method to Use When Solving a Quadratic Equation

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the equation by the method of your choice.

1) $(7x + 7)^2 = 9$

A) $\left\{-\frac{10}{7}, -\frac{4}{7}\right\}$ B) $\left\{\frac{4}{7}, \frac{10}{7}\right\}$ C) $\left\{-\frac{4}{7}, 0\right\}$ D) $\left\{\frac{2}{7}\right\}$

2) $7x^2 - 34x - 5 = 0$

A) $\left\{-\frac{1}{7}, 5\right\}$ B) $\left\{-\frac{1}{7}, 7\right\}$ C) $\left\{-\frac{1}{7}, \frac{1}{34}\right\}$ D) {−7, 5}

3) $5x^2 + 8x = -1$

A) $\left\{\frac{-4 - \sqrt{11}}{5}, \frac{-4 + \sqrt{11}}{5}\right\}$ B) $\left\{\frac{-4 - \sqrt{11}}{10}, \frac{-4 + \sqrt{11}}{10}\right\}$

C) $\left\{\frac{-8 - \sqrt{11}}{5}, \frac{-8 + \sqrt{11}}{5}\right\}$ D) $\left\{\frac{-4 - \sqrt{21}}{5}, \frac{-4 + \sqrt{21}}{5}\right\}$

4) $4x^2 = -12x - 6$

A) $\left\{\frac{-3-\sqrt{3}}{2}, \frac{-3+\sqrt{3}}{2}\right\}$

B) $\left\{\frac{-3-\sqrt{3}}{8}, \frac{-3+\sqrt{3}}{8}\right\}$

C) $\left\{\frac{-12-\sqrt{3}}{2}, \frac{-12+\sqrt{3}}{2}\right\}$

D) $\left\{\frac{-3-\sqrt{15}}{2}, \frac{-3+\sqrt{15}}{2}\right\}$

5) $4x^2 + 12x + 6 = 0$

A) $\left\{\frac{-3-\sqrt{3}}{2}, \frac{-3+\sqrt{3}}{2}\right\}$

B) $\left\{\frac{-3-\sqrt{3}}{8}, \frac{-3+\sqrt{3}}{8}\right\}$

C) $\left\{\frac{-12-\sqrt{3}}{2}, \frac{-12+\sqrt{3}}{2}\right\}$

D) $\left\{\frac{-3-\sqrt{15}}{2}, \frac{-3+\sqrt{15}}{2}\right\}$

6) $3x^2 = 21$

A) $\{-\sqrt{7}, \sqrt{7}\}$ B) $\{8\}$ C) $\{-7, 7\}$ D) $\{10.5\}$

7) $7x^2 - 21 = 0$

A) $\{-\sqrt{3}, \sqrt{3}\}$ B) $\{-\sqrt{21}, \sqrt{21}\}$ C) $\left\{-\frac{\sqrt{21}}{7}, \frac{\sqrt{21}}{7}\right\}$ D) $\{\sqrt{3}\}$

8) $x^2 + 18x + 70 = 0$

A) $\{-9-\sqrt{11}, -9+\sqrt{11}\}$

B) $\{9+\sqrt{11}\}$

C) $\{9-\sqrt{70}, 9+\sqrt{70}\}$

D) $\{-18+\sqrt{70}\}$

9) $3x^2 + 42x + 222 = 0$

A) $\{-7-5i, -7+5i\}$ B) $\{-7-25i, -7+25i\}$ C) $\{-7+5i\}$ D) $\{-12, -2\}$

10) $(3x + 4)^2 = 5$

A) $\left\{\frac{-4\pm\sqrt{5}}{3}\right\}$ B) $\left\{\frac{4\pm\sqrt{5}}{3}\right\}$ C) $\left\{\frac{\sqrt{5}\pm 4}{3}\right\}$ D) $\left\{-3, \frac{1}{3}\right\}$

11) $(x + 9)(x - 2) = 7$

A) $\left\{\frac{-7\pm\sqrt{149}}{2}\right\}$ B) $\left\{\frac{7\pm\sqrt{149}}{2}\right\}$ C) $\left\{\frac{-7\pm i\sqrt{149}}{2}\right\}$ D) $\left\{\frac{7\pm i\sqrt{149}}{2}\right\}$

12) $\frac{x^2}{12} + x + \frac{13}{6} = 0$

A) $\{-6\pm\sqrt{10}\}$ B) $\{6+\sqrt{10}\}$ C) $\{6\pm\sqrt{26}\}$ D) $\{-12+\sqrt{26}\}$

13) $\frac{1}{x+13} + \frac{1}{x} = \frac{1}{2}$

A) $\left\{\frac{-9\pm\sqrt{185}}{2}\right\}$ B) $\left\{\frac{-17\pm\sqrt{185}}{2}\right\}$ C) $\left\{\frac{17\pm\sqrt{185}}{2}\right\}$ D) $\left\{\frac{9\pm\sqrt{185}}{2}\right\}$

14) $\frac{2x}{x-7} - \frac{x}{x-4} = \frac{6}{x^2 - 11x + 28}$

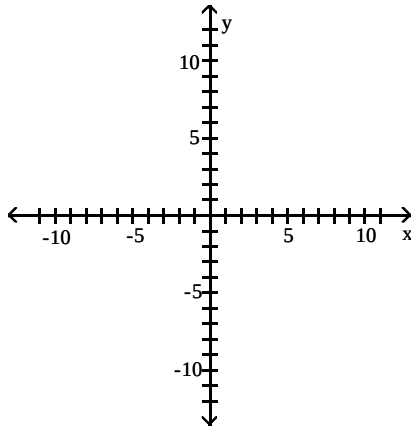
A) $\left\{\frac{1 \pm 5}{2}\right\}$ B) $\left\{\frac{-1 \pm 5}{2}\right\}$ C) $\left\{\frac{1 \pm i\sqrt{23}}{2}\right\}$ D) $\left\{\frac{-1 \pm i\sqrt{23}}{2}\right\}$

15) $5x^2 - \sqrt{11}x - 3 = 0$

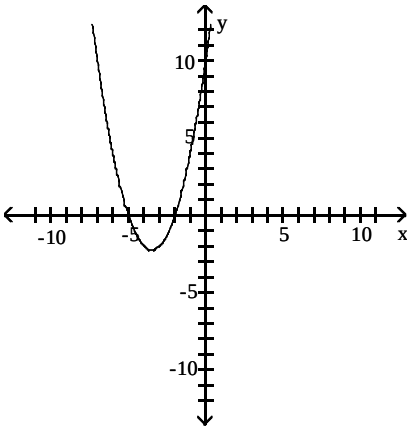
A) $\left\{\frac{\sqrt{11} \pm \sqrt{71}}{10}\right\}$ B) $\left\{\frac{-\sqrt{11} \pm \sqrt{71}}{10}\right\}$ C) $\left\{\frac{\sqrt{11} \pm 7i}{10}\right\}$ D) $\left\{\frac{\sqrt{11} \pm \sqrt{181}}{10}\right\}$

Find the x–intercept(s) of the graph of the equation. Graph the equation.

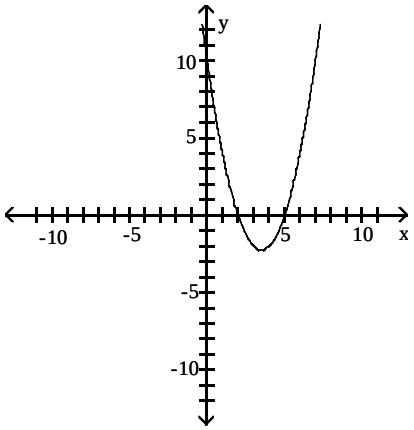
16) $y = x^2 + 7x + 10$



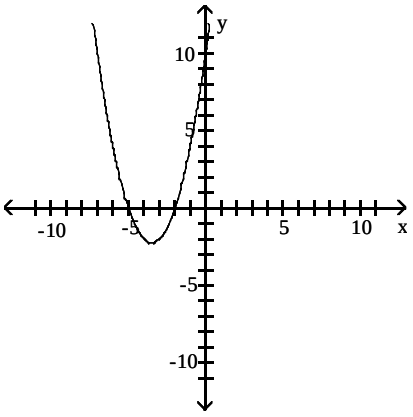
A) x–intercepts: –2 and –5



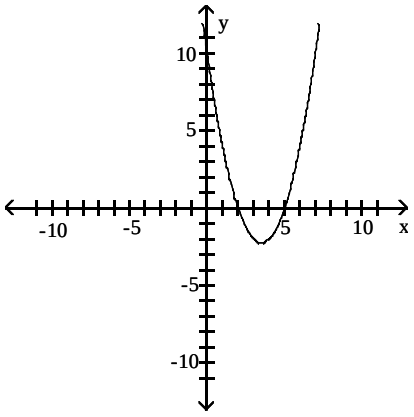
B) x–intercepts: 2 and 5



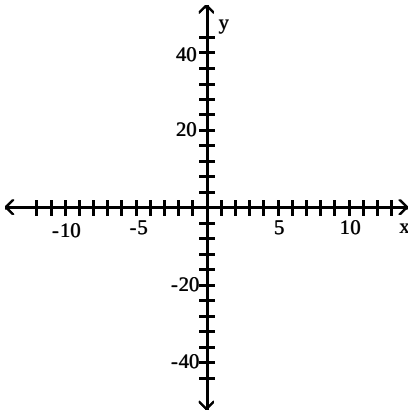
C) x–intercepts: 2 and 5



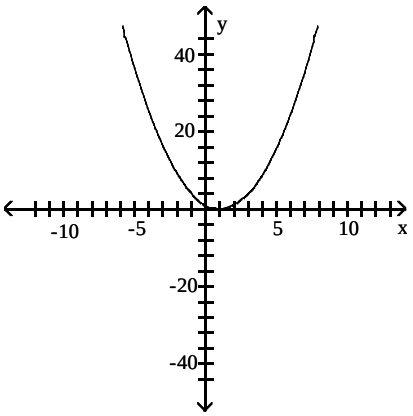
D) x–intercepts: –2 and –5



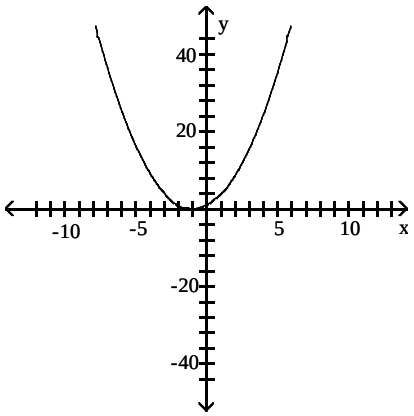
17) $y = x^2 - 2x + 1$



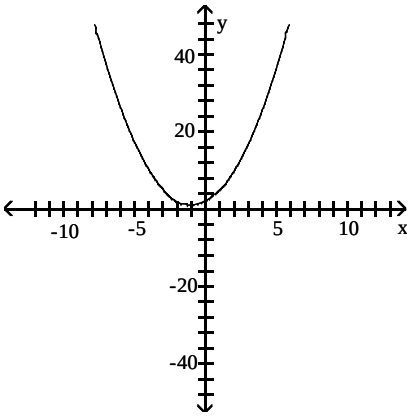
A) x–intercept: 1



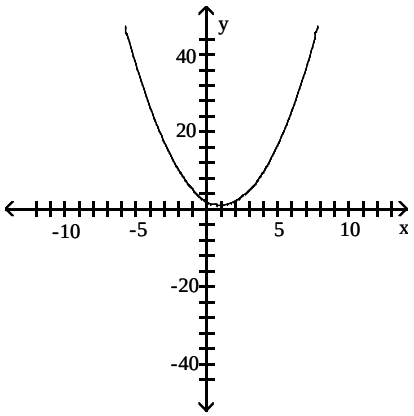
B) x–intercept: –1



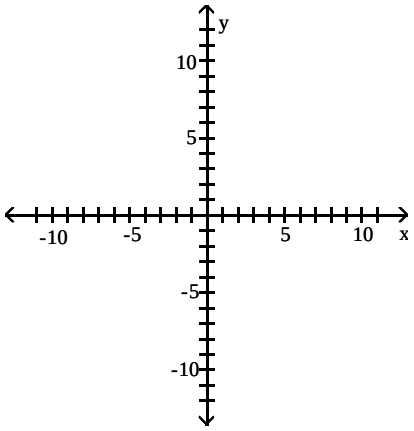
C) x–intercept: 2



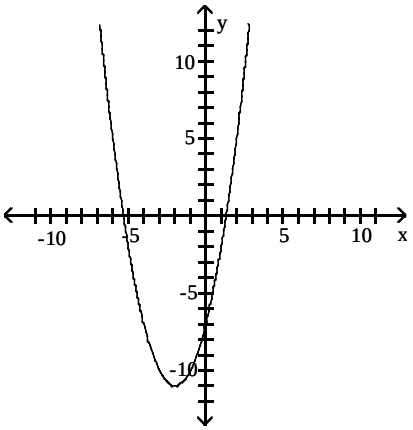
D) x–intercept: none



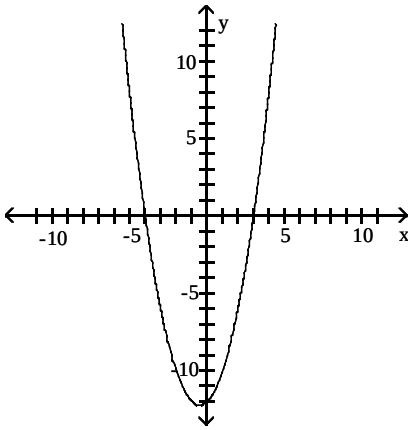
18) $y = x^2 + 4x - 7$



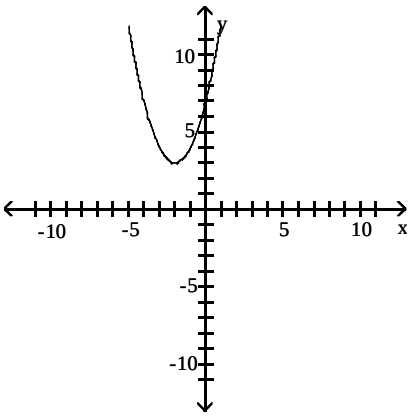
A) x-intercepts: $-2 \pm \sqrt{11}$



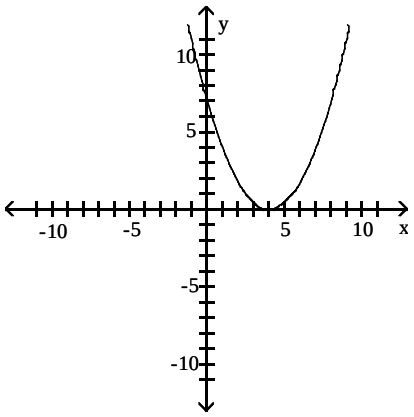
B) x-intercepts: –4 and 3



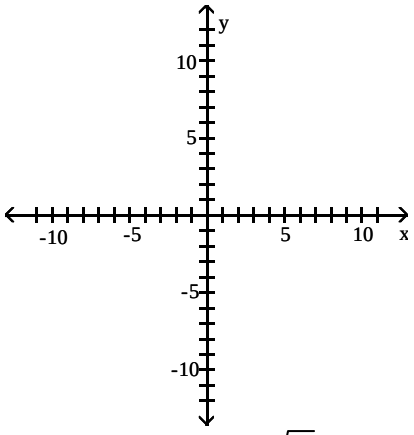
C) x-intercepts: none



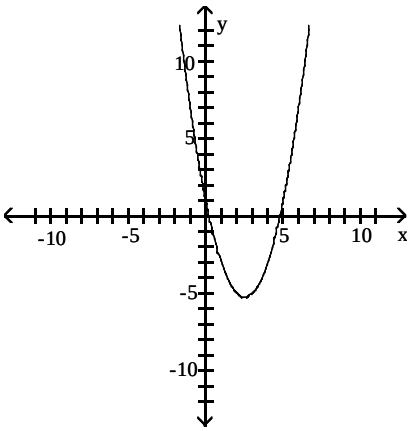
D) x-intercept: 4



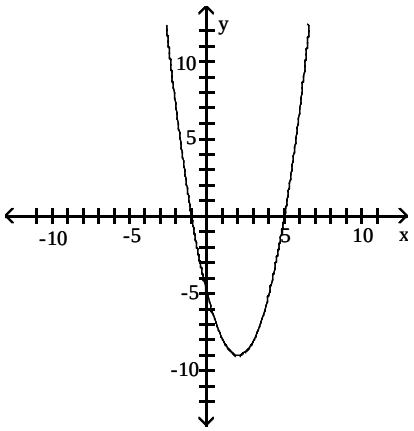
19) $y = x^2 - 5x + 1$



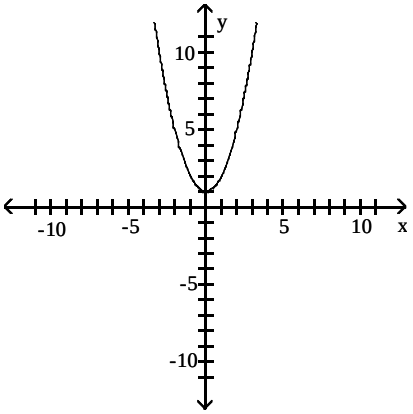
A) x-intercepts: $\frac{5 \pm \sqrt{21}}{2}$



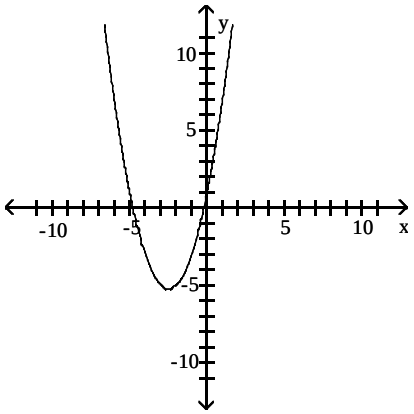
B) x-intercepts: –1 and 5



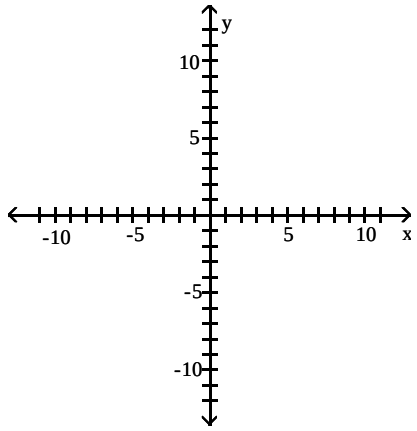
C) x-intercepts: none



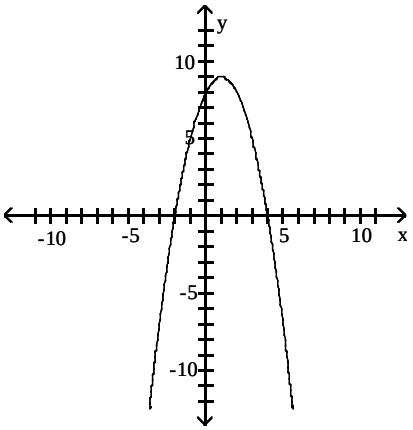
D) x-intercepts: $\frac{-5 \pm \sqrt{21}}{2}$



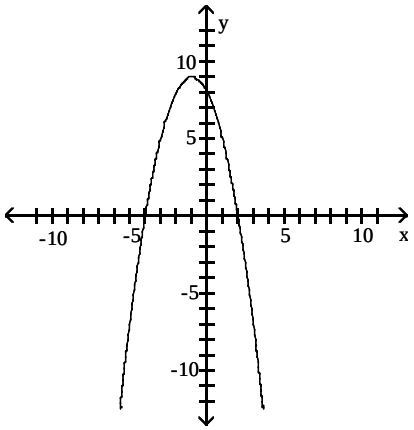
20) $y = -x^2 + 2x + 8$



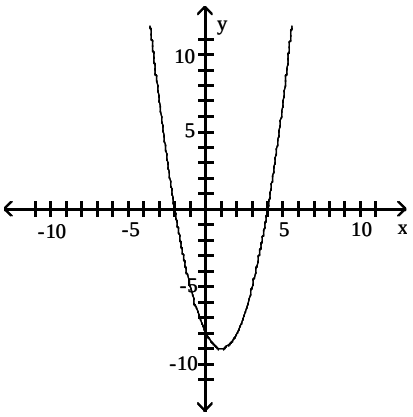
A) x-intercepts: -2 and 4



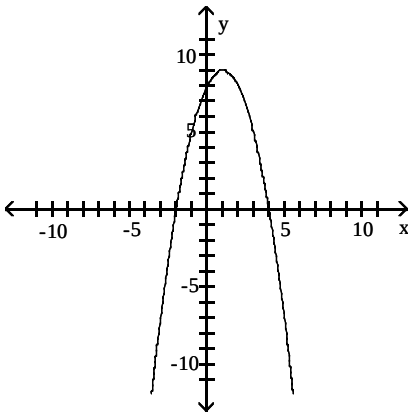
B) x-intercepts: -4 and 2



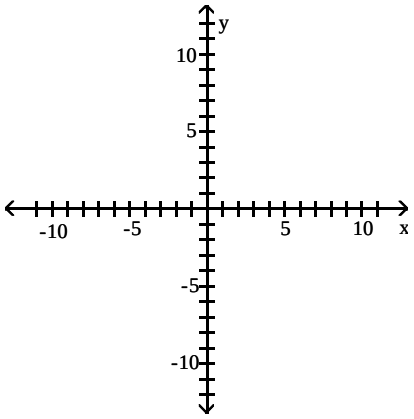
C) x-intercepts: -2 and 4



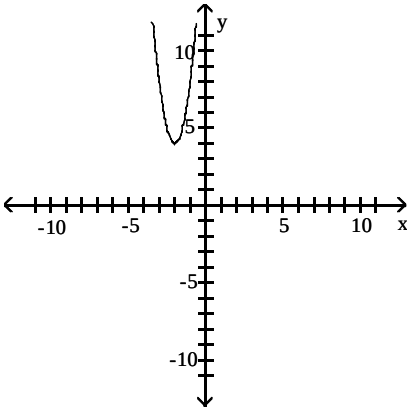
D) x-intercepts: -4 and 2



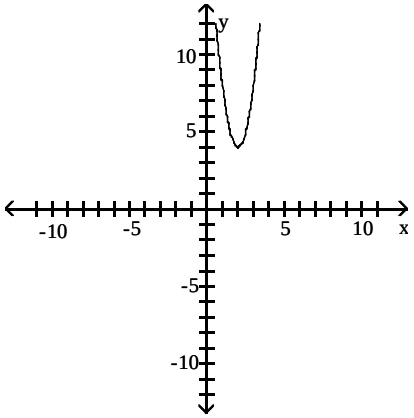
21) $y = 4x^2 + 16x + 20$



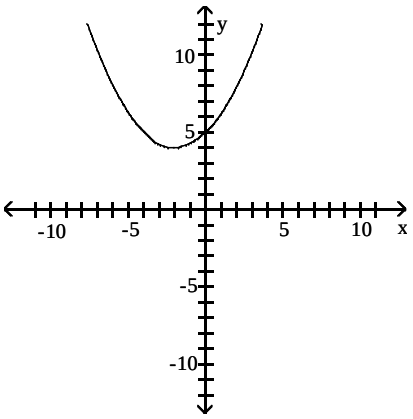
A) x–intercepts: none



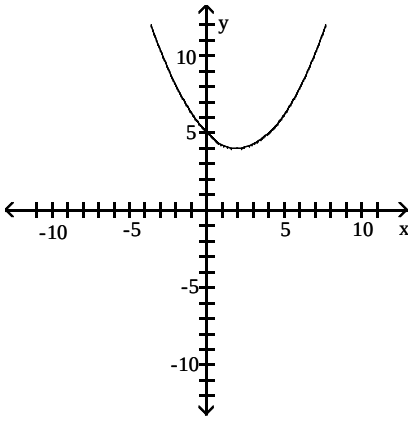
B) x–intercepts: none



C) x–intercepts: none



D) x–intercepts: none



Find all values of x satisfying the given conditions.

22) $y = x^2 + 8x$ and $y = 4$

A) $-4 \pm 2\sqrt{5}$ B) $-4 \pm 2\sqrt{10}$ C) $\pm 2\sqrt{5}$ D) $2\sqrt{5} \pm 4$

23) $y = 5x^2 - 19x - 4$ and $y = 0$

A) $-\frac{1}{5}, 4$ B) $-\frac{1}{5}, 5$ C) $\frac{1}{19}, -\frac{1}{5}$ D) $-5, 4$

24) $y_1 = (x + 10)$, $y_2 = (x - 3)$, and $y_1 y_2 = 7$

A) $\frac{-7 \pm \sqrt{197}}{2}$ B) $\frac{7 \pm \sqrt{197}}{2}$ C) $\frac{-7 \pm i\sqrt{197}}{2}$ D) $\frac{7 \pm i\sqrt{197}}{2}$

25) $y_1 = \frac{1}{x + 3}$, $y_2 = \frac{1}{x}$, and $y_1 + y_2 = \frac{1}{10}$

A) $\frac{17 \pm \sqrt{409}}{2}$ B) $\frac{-23 \pm \sqrt{409}}{2}$ C) $\frac{23 \pm \sqrt{409}}{2}$ D) $\frac{-17 \pm \sqrt{409}}{2}$

26) $y_1 = 7 - 7x$, $y_2 = (4x + 9)(x - 1)$, and $y_1 - y_2 = 0$

A) –4, 1 B) 1, $-\frac{9}{4}$ C) –1, 4 D) 1

7 Solve Problems Modeled by Quadratic Equations

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

1) The formula $N = 3x^2 + 2x + 1$ represents the number of households N, in thousands, in a certain city that have a computer x years after 1990. According to the formula, in what year were there 57 thousand households with computers in this city?

A) 1994 B) 1993 C) 1992 D) 1995

2) The formula $P = 0.62x^2 - 0.042x + 2$ models the approximate population P, in thousands, for a species of fish in a local pond, x years after 1997. During what year will the population reach 63,580 fish?

A) 2007 B) 2006 C) 2008 D) 2009

3) The revenue for a small company is given by the quadratic function $r(t) = 9t^2 + 4t + 780$ where t is the number of years since 1998 and r(t) is in thousands of dollars. If this trend continues, find the year after 1998 in which the company's revenue will be $873 thousand. Round to the nearest whole year.

A) 2001 B) 2002 C) 2003 D) 2004

4) A square sheet of paper measures 39 centimeters on each side. What is the length of the diagonal of this paper?

A) $39\sqrt{2}$ cm B) 39 cm C) 3042 cm D) 78 cm

5) A ladder that is 17 feet long is 8 feet from the base of a wall. How far up the wall does the ladder reach?

A) 15 ft B) $\sqrt{353}$ ft C) 3 ft D) 225 ft

6) A 15–foot pole is supported by two wires that extend from the top of the pole to points that are each 15 feet from the base of the pole. Find the total length of the two wires.

A) $30\sqrt{2}$ ft B) $15\sqrt{2}$ ft C) 900 ft D) 60 ft

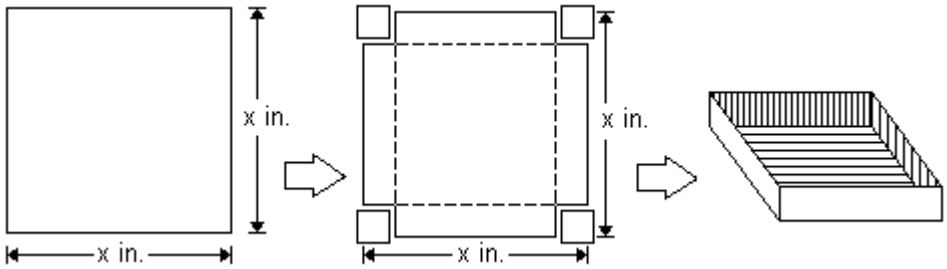
7) The length of a rectangular storage room is 2 feet longer than its width. If the area of the room is 195 square feet, find its dimensions.

A) 13 feet by 15 feet B) 12 feet by 16 feet C) 14 feet by 16 feet D) 12 feet by 14 feet

8) A machine produces open boxes using square sheets of plastic. The machine cuts equal–sized squares measuring 4 inches on a side from each corner of the sheet, and then shapes the plastic into an open box by turning up the sides. If each box must have a volume of 1600 cubic inches, find the length of one side of the open box.

A) 20 in. B) 24 in. C) 28 in. D) 19 in.

9) Suppose that an open box is to be made from a square sheet of cardboard by cutting out 2–inch squares from each corner as shown and then folding along the dotted lines. If the box is to have a volume of 200 cubic inches, find the original dimensions of the sheet of cardboard.



A) 14 in. by 14 in. B) $10\sqrt{2}$ in. by $10\sqrt{2}$ in.

C) $\sqrt{10}$ in. by $2\sqrt{5}$ in. D) 10 in. by 10 in.

10) A rain gutter is made from sheets of aluminum that are 28 inches wide. The edges are turned up to form right angles. Determine the depth of the gutter that will allow a cross–sectional area of 53 square inches. There are two solutions to this problem. Round to the nearest tenth of an inch.

A) 2.3 in. and 11.7 in. B) 2.0 in. and 26.0 in. C) 2.7 in. and 14.1 in. D) 1.6 in. and 20.8 in.

1.6 Other Types of Equations

1 Solve Polynomial Equations by Factoring

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the polynomial equation by factoring and then using the zero product principle.

1) $3x^4 - 75x^2 = 0$

A) {–5, 0, 5} B) $\{-5\sqrt{3}, 0, 5\sqrt{3}\}$ C) {–5, 5} D) {0}

2) $5x^4 = 135x$

A) {0, 3} B) {–3, 0, 3} C) {0, 5, 3} D) {0}

3) $3x^3 + 5x^2 = 27x + 45$

A) $\left\{-3, -\frac{5}{3}, 3\right\}$ B) $\left\{-\frac{5}{3}, 0\right\}$ C) $\left\{-\frac{5}{3}, 3\right\}$ D) {–3, 3}

4) $4x - 5 = 16x^3 - 20x^2$

A) $\left\{-\frac{1}{2}, \frac{1}{2}, \frac{5}{4}\right\}$ B) $\left\{0, \frac{5}{4}\right\}$ C) $\left\{-\frac{1}{4}, \frac{1}{4}, \frac{5}{4}\right\}$ D) $\left\{-\frac{1}{2}, \frac{1}{2}, \frac{4}{5}\right\}$

5) $x^3 - 2x^2 - 24x = 0$

A) {0, –4, 6} B) {–4, 6} C) {0, 4, –6} D) {4, –6}

6) $x^3 + 2x^2 - x - 2 = 0$

A) {–1, 1, –2} B) {1, –2, 2} C) {–2, 2} D) {4}

7) $12x^3 + 84x^2 + 120x = 0$

A) {0, –5, –2} B) {–5, –2} C) {0, 5, 2} D) $\{-\frac{1}{5}, -2\}$

2 Solve Radical Equations

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the radical equation, and check all proposed solutions.

1) $\sqrt{x + 1} = 3$

A) {8} B) {9} C) {10} D) {16}

2) $\sqrt{7x - 6} = 6$

A) {6} B) {36} C) $\left\{\frac{30}{7}\right\}$ D) ∅

3) $\sqrt{5x + 24} = x$

A) {8} B) {–3, 8} C) {– 6} D) ∅

4) $\sqrt{26x - 39} = x + 5$

A) {8} B) {–7} C) {–8} D) {10}

5) $x - \sqrt{3x - 2} = 4$

A) {9} B) {2, 9} C) {–1} D) {1, 2}

6) $\sqrt{2x} + 8 = x + 4$

A) {8} B) {2, 8} C) {–4} D) $\left\{-4, \frac{4}{3}\right\}$

7) $\sqrt{2x + 3} - \sqrt{x + 1} = 1$

A) {–1, 3} B) {3} C) {–3, –1} D) ∅

8) $\sqrt{2x + 5} - \sqrt{x - 2} = 3$

A) {2, 38} B) {3, 8} C) {2} D) {–2}

9) $\sqrt{x + 6} + \sqrt{2 - x} = 4$

A) {–2} B) {2, –2} C) {0} D) $\{\sqrt{31}, -2\}$

10) $\sqrt{2\sqrt{x+3}} = \sqrt{4x-5}$

A) $\left\{\frac{11+\sqrt{69}}{8}\right\}$ B) $\left\{\frac{11-\sqrt{69}}{8}, \frac{11+\sqrt{69}}{8}\right\}$

C) $\left\{\frac{11}{2}\right\}$ D) $\varnothing$

11) $\sqrt{1+5\sqrt{x}} = 1+\sqrt{x}$

A) {0, 9} B) {0, 1} C) {0, 25} D) {0, 49}

Find the x–intercepts of the graph of the equation.

12) $y = \sqrt{2x+3} - \sqrt{x+1} - 1$

A) 3, –1 B) 3 C) –3, –1 D) No x–intercepts

13) $y = \sqrt{2x+5} - \sqrt{x-2} - 3$

A) 2, 38 B) 3, 8 C) 2 D) –2

14) $y = \sqrt{3x-2} + \sqrt{11+x} + 1$

A) No x–intercepts B) 0 C) $-\frac{5}{2}$ D) 5

15) $y = \sqrt{x+6} + \sqrt{2-x} - 4$

A) –2 B) 2, –2 C) 0 D) $\sqrt{31}$, –2

Find all values of x satisfying the given conditions.

16) $y = x - \sqrt{3x-2}$ and $y = 4$

A) 9 B) 2, 9 C) –1 D) 1, 2

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

17) Solve the formula $r = \sqrt{\frac{3V}{\pi h}}$ for V.

18) Solve the formula $r = \sqrt{\frac{2A}{\theta}}$ for θ.

3 Solve Equations with Rational Exponents

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve and check the equation.

1) $x^{3/2} = 8$

A) {4} B) {2} C) $\left\{\sqrt[3]{2}\right\}$ D) $\{16\sqrt{2}\}$

2) $3x^{5/2} - 6 = 0$

A) $\left\{\sqrt[5]{4}\right\}$ B) $\left\{\sqrt[5]{2}\right\}$ C) $\left\{\frac{4}{5}\right\}$ D) $\varnothing$

3) $(x + 7)^{3/2} = 27$

A) {2} B) {–4} C) $\left\{\sqrt[3]{3} - 7\right\}$ D) {16}

4) $(5x + 3)^{1/2} = 3$

A) $\left\{\frac{6}{5}\right\}$ B) $\left\{\frac{9}{5}\right\}$ C) $\left\{-\frac{3}{5}\right\}$ D) 15

5) $(2x + 1)^{1/3} = 5$

A) $\{62\}$ B) $\{12\}$ C) $\left\{\frac{125}{2}\right\}$ D) $\{123\}$

6) $(6x - 6)^{1/3} - 2 = 5$

A) $\left\{\frac{349}{6}\right\}$ B) $\left\{\frac{9}{2}\right\}$ C) $\left\{\frac{55}{6}\right\}$ D) $\varnothing$

7) $(x^2 + 8x + 16)^{3/4} - 17 = 10$

A) {–13, 5} B) {5} C) {–13, 0, 5} D) {27}

Find all values of x satisfying the given conditions.

8) $y = (x + 9)^{3/2}$ and $y = 125$

A) {16} B) {–4} C) $\left\{\sqrt[3]{5} - 9\right\}$ D) {34}

4 Solve Equations That Are Quadratic in Form

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the equation by making an appropriate substitution.

1) $x^4 - 13x^2 + 36 = 0$

A) {–2, 2, –3, 3} B) {4, 9} C) {2, 3} D) {–2i, 2i, –3i, 3i}

2) $x^4 - 21x^2 + 80 = 0$

A) $\{-4, 4, -\sqrt{5}, \sqrt{5}\}$ B) $\{-4, 4, -i\sqrt{5}, i\sqrt{5}\}$ C) {16, 5} D) $\{4, \sqrt{5}\}$

3) $x^4 - 10x^2 - 96 = 0$

A) $\{-4, 4, -i\sqrt{6}, i\sqrt{6}\}$ B) $\{-\sqrt{6}, \sqrt{6}, -4i, 4i\}$ C) {–16, 6} D) $\{4, i\sqrt{6}\}$

4) $x - 2\sqrt{x} - 8 = 0$

A) {16} B) {8} C) {32} D) {12}

5) $x - 9\sqrt{x} + 20 = 0$

A) {16, 25} B) {4, 5} C) {–4, 4, –5, 5} D) $\{-2, 2, -\sqrt{5}, \sqrt{5}\}$

6) $2x - 11\sqrt{x} - 6 = 0$

A) {36} B) {6} C) $\left\{\frac{1}{4}, 36\right\}$ D) $\left\{\frac{1}{2}, 6\right\}$

7) $x^{-2} + x^{-1} - 90 = 0$

A) $\left\{-\frac{1}{10}, \frac{1}{9}\right\}$ B) $\left\{\frac{1}{10}, -\frac{1}{9}\right\}$ C) {10, –9} D) {–10, 9}

8) $x^{-2} + 10x^{-1} + 9 = 0$

A) $\left\{-\frac{1}{9}, -1\right\}$ B) $\left\{\frac{1}{9}, 1\right\}$ C) {1, 9} D) {–1, –9}

9) $6x^{-2} - 7x^{-1} + 1 = 0$

A) {1, 6} B) $\left\{-\frac{1}{6}, -1\right\}$ C) {–1, –6} D) $\left\{\frac{1}{6}, 1\right\}$

10) $x^{-2} - 12x^{-1} + 34 = 0$

A) $\left\{\frac{6 \pm \sqrt{2}}{34}\right\}$ B) $\left\{\frac{6 \pm 2\sqrt{2}}{34}\right\}$ C) $\left\{\frac{-6 \pm \sqrt{2}}{34}\right\}$ D) $\left\{\frac{6 \pm \sqrt{2}}{38}\right\}$

11) $x - 2x^{1/2} - 8 = 0$

A) {16} B) {8} C) {32} D) {12}

12) $x^{2/3} - 5x^{1/3} + 6 = 0$

A) {8, 27} B) {2, 3} C) {–3, –2} D) {–27, –8}

13) $x^{2/5} - x^{1/5} - 6 = 0$

A) {243, –32} B) {–243, 32} C) {3, –2} D) {–3, 2}

14) $2x^{1/2} - 13x^{1/4} - 7 = 0$

A) {2401} B) $\left\{2401, \frac{1}{16}\right\}$ C) {–7, –1} D) $\left\{7, -\frac{1}{2}\right\}$

15) $x^{1/2} - 15x^{1/4} + 50 = 0$

A) {625, 10,000} B) {25, 100} C) {–5, –10} D) {5, 10}

16) $(x + 6)^2 - 4(x + 6) - 5 = 0$

A) {–7, –1} B) {5, 11} C) {–11, –5} D) {1, 7}

17) $(-4x + 6)^2 + 15(-4x + 6) + 54 = 0$

A) $\left\{3, 3\frac{3}{4}\right\}$ B) $\left\{-3, -3\frac{3}{4}\right\}$ C) {–6, –9} D) $\left\{0, \frac{3}{4}\right\}$

18) $(4x - 7)^2 + 4(4x - 7) - 12 = 0$

A) $\left\{\frac{1}{4}, \frac{9}{4}\right\}$ B) $\left\{-\frac{1}{4}, -\frac{9}{4}\right\}$ C) $\left\{\frac{13}{4}, -\frac{5}{4}\right\}$ D) $\left\{-\frac{13}{7}, \frac{5}{4}\right\}$

19) $(x^2 - 2x)^2 - 23(x^2 - 2x) + 120 = 0$

A) {– 3, – 2, 5, 4} B) {15, 8}

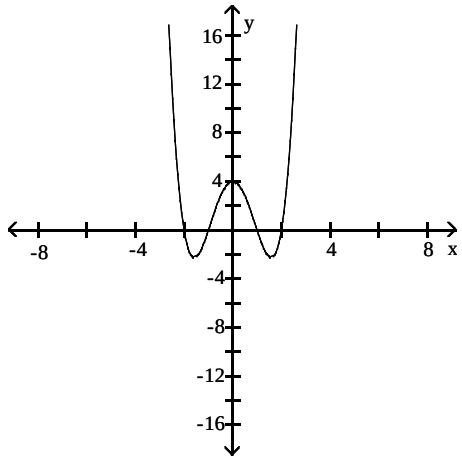
C) {5, 4} D) {– 3, – 2, 15, 8, 5, 4}

20) $\left(y - \frac{10}{y}\right)^2 - 6\left(y - \frac{10}{y}\right) - 27 = 0$

A) {– 5, – 1, 2, 10} B) {–3, 9} C) {– 5, 2} D) no solution

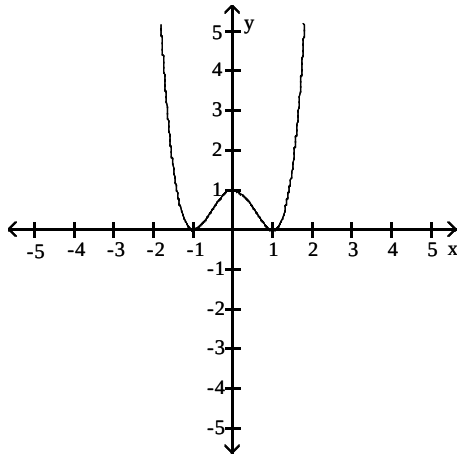
Match the graph with its function using the x–intercepts.

21)



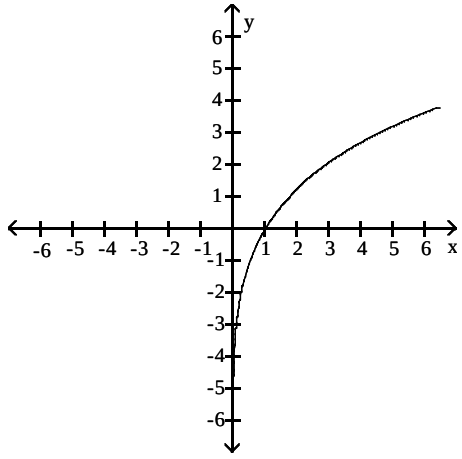
A) $y = x^4 - 5x^2 + 4$ B) $y = x^4 + 5x^2 + 4$ C) $y = x^4 - 5x^2 - 4$ D) $y = x^4 + 5x^2 - 4$

22)



A) $y = x^4 - 2x^2 + 1$ B) $y = x^4 + 2x^2 + 1$ C) $y = x^4 - 2x^2 - 1$ D) $y = x^4 + 2x^2 - 1$

23)



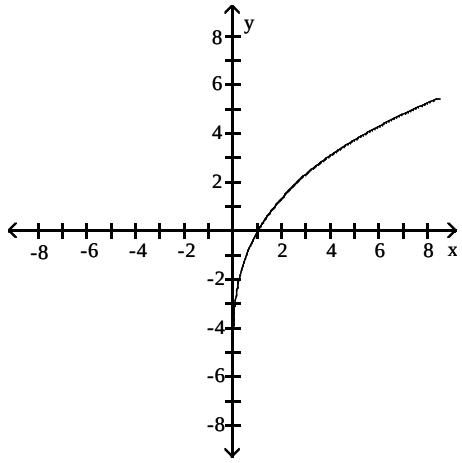
A) $y = x^{1/3} + 8x^{1/6} - 9$

B) $y = x^{1/3} - 8x^{1/6} - 9$

C) $y = x^{1/3} + 8x^{1/6} + 9$

D) $y = x^{1/3} - 8x^{1/6} + 9$

24)



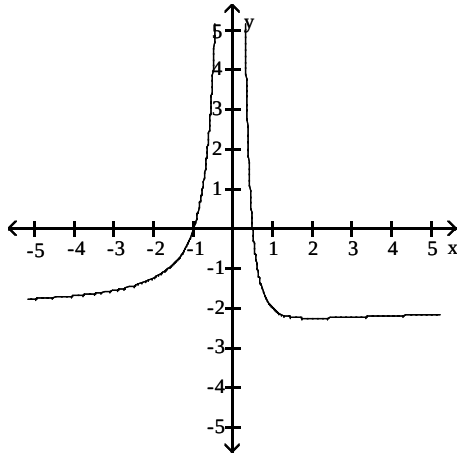
A) $y = x^{1/2} + 5x^{1/4} - 6$

B) $y = x^{1/2} - 5x^{1/4} - 6$

C) $y = x^{1/2} + 2x^{1/4} + 1$

D) $y = x^{1/2} + 2x^{1/4} - 1$

25)



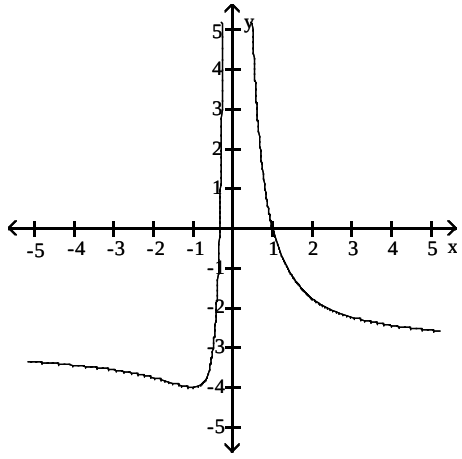
A) $y = x^{-2} - x^{-1} - 2$

B) $y = x^{-2} - x^{-1} + 2$

C) $y = x^{-2} + x^{-1} - 2$

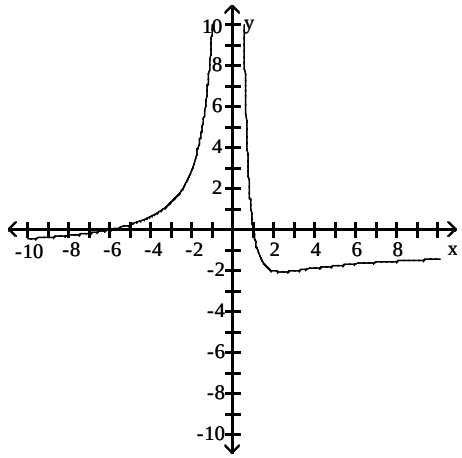
D) $y = x^{-2} + x^{-1} + 2$

26)



A) $y = x^{-2} + 2x^{-1} - 3$ B) $y = x^{-2} - 2x^{-1} - 3$ C) $y = x^{-2} + 2x^{-1} + 3$ D) $y = x^{-2} - 2x^{-1} + 3$

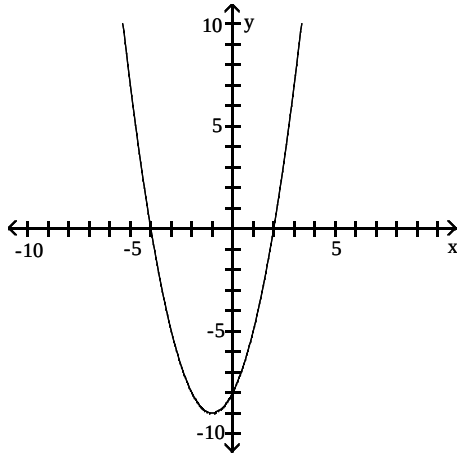
27)



A) $y = 6x^{-2} - 5x^{-1} - 1$ B) $y = 6x^{-2} + 5x^{-1} - 1$

C) $y = 6x^{-2} - 5x^{-1} + 1$ D) $y = 6x^{-2} + 5x^{-1} + 1$

28)



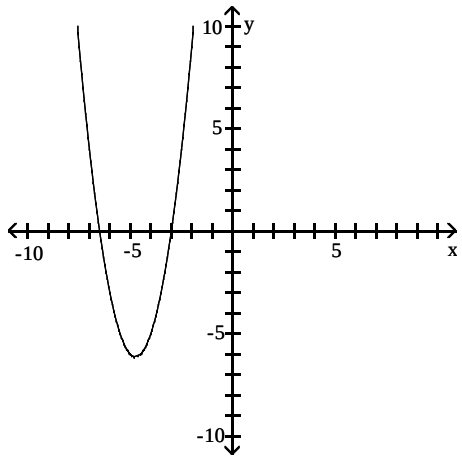
A) $y = (x + 3)^2 - 4(x + 3) - 5$

B) $y = (x + 3)^2 + 4(x + 3) - 5$

C) $y = (x + 3)^2 + 2(x + 3) - 8$

D) $y = (x + 3)^2 - 2(x + 3) - 8$

29)



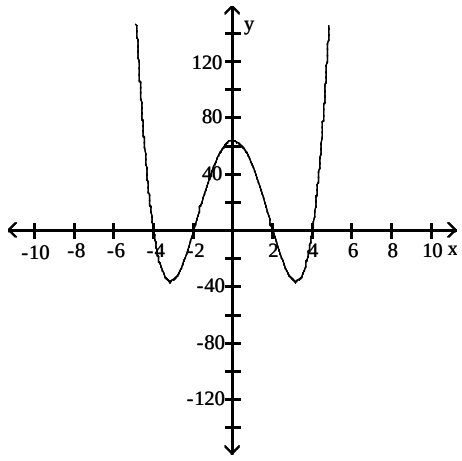
A) $y = 2(x + 4)^2 + 3(x + 4) - 5$

B) $y = 2(x + 4)^2 - 3(x + 4) - 5$

C) $y = 2(x - 4)^2 + 3(x - 4) - 5$

D) $y = 2(x - 4)^2 - 3(x - 4) - 5$

30)



A) $y = x^4 - 20x^2 + 64$ B) $y = x^4 + 20x^2 + 64$ C) $y = x^4 - 20x^2 + 8$ D) $y = x^4 + 20x^2 - 8$

Find all values of x satisfying the given conditions.

31) $y = (x^2 - 2x)^2 - 18(x^2 - 2x)$ and $y = -45$

A) – 1, – 3, 3, 5 B) 3, 15 C) 3, 5 D) – 1, – 3, 3, 15, 3, 5

32) $y = \left(x - \frac{15}{x}\right)^2 - 12\left(x - \frac{15}{x}\right)$ and $y = 28$

A) – 5, – 1, 3, 15 B) –2, 14 C) – 5, 3 D) No solution

33) $y = x^{2/3} - 6x^{1/3}$ and $y = -8$

A) 8, 64 B) 2, 4 C) –4, –2 D) –64, –8

34) $y_1 = 5(4x - 1)^{-1}$, $y_2 = 2(4x - 1)^{-2}$, and y_1 exceeds y_2 by 2

A) $\frac{3}{4}, \frac{3}{8}$ B) $-2, -\frac{1}{2}$ C) $-\frac{1}{4}, 0$ D) $-\frac{1}{4}, -\frac{1}{8}$

35) $y_1 = \frac{x}{x - 2} + 10$, $y_2 = 7\sqrt{\frac{x}{x - 2}}$, and $y_1 = y_2$

A) $\frac{25}{12}, \frac{8}{3}$ B) 5, 2 C) $\frac{5}{2}, 4$ D) $-\frac{25}{12}, -\frac{8}{3}$

5 Solve Equations Involving Absolute Value

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the absolute value equation or indicate that the equation has no solution.

1) $|x| = 5$

A) {–5, 5} B) {5} C) {–5} D) {25}

2) $|x - 1| = 3$

A) {–2, 4} B) {2, 4} C) {–4} D) ∅

3) $|x + 3| = 3$

A) {–6, 0} B) {0, 6} C) {0} D) ∅

4) $|8x + 6| = 4$

A) $\left\{-\frac{1}{4}, -\frac{5}{4}\right\}$ B) $\left\{-\frac{1}{3}, -\frac{5}{3}\right\}$ C) $\left\{\frac{1}{4}, \frac{5}{4}\right\}$ D) ∅

5) $3|x - 3| = 18$

A) {9, –3} B) {3, –9} C) {3} D) ∅

6) $|2x + 3| + 9 = 11$

A) $\left\{-\frac{5}{2}, -\frac{1}{2}\right\}$ B) $\{-\frac{5}{3}, -\frac{1}{3}\}$ C) $\left\{\frac{1}{2}, \frac{5}{2}\right\}$ D) ∅

7) $|6x - 4| - 3 = -12$

A) $\left\{-\frac{5}{6}, -\frac{13}{6}\right\}$ B) $\left\{-\frac{5}{6}\right\}$ C) $\left\{\frac{13}{6}, \frac{5}{6}\right\}$ D) ∅

8) $|8x + 2| = |x + 2|$

A) $\left\{0, -\frac{4}{9}\right\}$ B) $\left\{0, \frac{2}{9}\right\}$ C) $\left\{0, \frac{4}{9}\right\}$ D) ∅

9) $\left|\frac{1}{2}x + 2\right| = \left|\frac{3}{4}x - 2\right|$

A) {16, 0} B) {16, 12} C) {10, 10} D) ∅

10) $\left|\frac{5x + 20}{4}\right| = 5$

A) {–8, 0} B) {–8, 8} C) {8, 0} D) ∅

11) $|2(x + 1) + 6| = 10$

A) {–9, 1} B) {–7, 3} C) {–9, 0} D) {–7, 0}

12) $|x^2 + 5x| = 0$

A) {0, –5} B) {5, 0, –5} C) {5, 0} D) ∅

13) $|x^2 - 4x - 4| = 8$

A) {–2, 2, 6} B) {2, 6} C) {–2, 2} D) {–2, 2, –6}

14) $|2x^2 - x - 1| = 3$

A) $\left\{\frac{1 - \sqrt{33}}{4}, \frac{1 + \sqrt{33}}{4}\right\}$ B) $\left\{-\frac{1 - \sqrt{33}}{4}, -\frac{1 + \sqrt{33}}{4}\right\}$

C) $\left\{\frac{1 - \sqrt{33}}{4}, -\frac{1 + \sqrt{33}}{4}\right\}$ D) ∅

15) $|x^2 - 4x + 4| = 2$

A) $\{2 - \sqrt{2}, 2 + \sqrt{2}\}$ B) $\{2 - \sqrt{2}\}$ C) $\{2 + \sqrt{2}\}$ D) $\varnothing$

Find all values of x satisfying the given conditions.

16) $y = |x - 4|$ and $y = 7$

A) –3, 11 B) –11, 3 C) 11 D) No solutions

17) $y = |5x + 3|$ and $y = 5$

A) $\frac{2}{5}, -\frac{8}{5}$ B) $\frac{2}{3}, -\frac{8}{3}$ C) $-\frac{2}{5}, \frac{8}{5}$ D) No solutions

6 Solve Problems Modeled by Equations

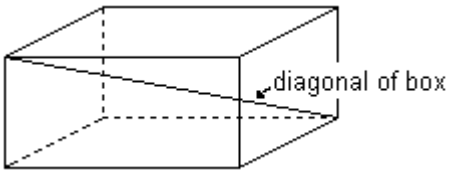
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

1) For a culture of 50,000 bacteria of a certain strain, the number of bacteria N that will survive x hours is modeled by the formula $N = 5000\sqrt{100 - x}$. After how many hours will 20,000 bacteria survive?

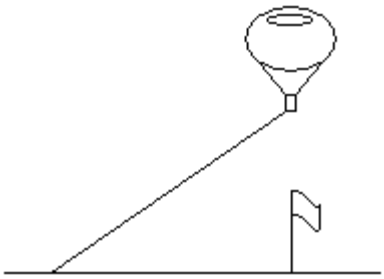
A) 84 hr B) 96 hr C) 80 hr D) 16 hr

2) A formula for the length of a diagonal from the upper corner of a box to the opposite lower corner is $d = \sqrt{L^2 + W^2 + H^2}$, where L, W, and H are the length, width, and height, respectively. Find the length of the diagonal of the box if the length is 22 inches, width is 10 inches, and height is 8 inches. Leave your answer in simplified radical form.



A) $18\sqrt{2}$ in. B) $4\sqrt{5}$ in. C) $2\sqrt{10}$ in. D) 36 in.

3) A balloon is secured to rope that is staked to the ground. A breeze blows the balloon so that the rope is taut while the balloon is directly above a flag pole that is 30 feet from where the rope is staked down. Find the altitude of the balloon if the rope is 120 feet long. Leave your answer in simplified radical form.



A) $30\sqrt{15}$ ft B) $15\sqrt{6}$ ft C) $30\sqrt{17}$ ft D) $3\sqrt{10}$ ft

4) A formula used to determine the velocity v in feet per second of an object (neglecting air resistance) after it has fallen a certain height is $v = \sqrt{2gh}$, where g is the acceleration due to gravity and h is the height the object has fallen. If the acceleration g due to gravity on Earth is approximately 32 feet per second per second, find the velocity of a bowling ball after it has fallen 90 feet. (Round to the nearest tenth.)

A) 75.9 ft per sec B) 53.7 ft per sec C) 13.4 ft per sec D) 5760 ft per sec

5) For a cone, the formula $r = \sqrt{\frac{3V}{\pi h}}$ describes the relationship between the radius r of the base, the volume V, and the height h. Find the volume if the radius is 7 inches and the cone is 11 inches high. (Use 3.14 as an approximation for π, and round to the nearest tenth.)

A) 564.2 cubic in. B) 80.6 cubic in. C) 5077.4 cubic in. D) 51.3 cubic in.

6) The formula $v = \sqrt{2.5r}$ can be used to estimate the maximum safe velocity v, in miles per hour, at which a car can travel along a curved road with a radius of curvature r, in feet. To the nearest whole number, find the radius of curvature if the maximum safe velocity is 20 miles per hour.

A) 160 ft B) 1000 ft C) 64 ft D) 400 ft

7) The function $f(x) = 6.75\sqrt{x} + 12$ models the amount, f(x), in billions of dollars of new student loans x years after 1993. According to the model, in what year is the amount loaned expected to reach \$25.5 billion?

A) 1997 B) 2000 C) 2002 D) 2001

8) When an object is dropped to the ground from a height of h meters, the time it takes for the object to reach the ground is given by the equation $t = \sqrt{\frac{h}{4.9}}$, where t is measured in seconds. Solve the equation for h. Use the result to determine the height from which an object was dropped if it hits the ground after falling for 4 seconds.

A) $h = 4.9t^2$; 78.4 m B) $h = 24.01t$; 96 m

C) $h = 24.01t^2$; 384.2 m D) $h = 4.9t$; 19.6 m

9) The maximum number of volts, E, that can be placed across a resistor is given by the formula $E = \sqrt{PR}$, where P is the number of watts of power that the resistor can absorb and R is the resistance of the resistor in ohms. Solve this equation for R. Use the result to determine the resistance of a resistor if P is $\frac{1}{4}$ watts and E is 30 volts.

A) $R = \frac{E^2}{P}$; 3600 ohms B) $R = \frac{E^2}{P^2}$; 14,400 ohms

C) $R = E^2P$; 3600 ohms D) $R = E^2P^2$; 14,400 ohms

10) The number of centimeters, d, that a spring is compressed from its natural, uncompressed position is given by the formula $d = \sqrt{\frac{2W}{k}}$, where W is the number of joules of work done to move the spring and k is the spring constant. Solve this equation for W. Use the result to determine the work needed to move a spring 4 centimeters if it has a spring constant of 0.4.

A) $W = \frac{d^2k}{2}$; 3.2 joules B) $W = \frac{d^2k^2}{4}$; 0.6 joules

C) $W = \frac{2d^2}{k}$; 80 joules D) $W = 2d^2k$; 12.8 joules

11) The algebraic expression $0.07d^{3/2}$ describes the duration of a storm, in hours, whose diameter is d miles. Use a calculator to determine the duration of a storm with a diameter of 5 miles. Round to the nearest hundredth.

A) 0.78 hr B) 0.16 hr C) 11.18 hr D) 0.21 hr

12) Two cars leave an intersection. One car travels north; the other east. When the car traveling north had gone 15 mi, the distance between the cars was 5 mi more than the distance traveled by the car heading east. How far had the east bound car traveled?

A) 20 mi B) 25 mi C) 15 mi D) 30 mi

13) A ladder is resting against a wall. The top of the ladder touches the wall at a height of 12 ft. Find the length of the ladder if the length is 4 ft more than its distance from the wall.

A) 20 ft B) 16 ft C) 12 ft D) 24 ft

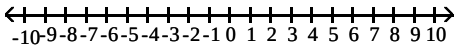
1.7 Linear Inequalities and Absolute Value Inequalities

1 Use Interval Notation

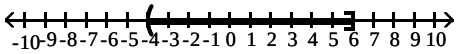
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Express the interval in set–builder notation and graph the interval on a number line.

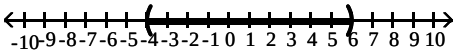
1) $(-4, 6]$



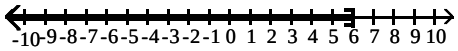
A) $\{x \mid -4 < x \le 6\}$



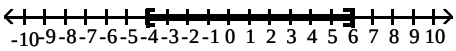
B) $\{x \mid -4 < x < 6\}$



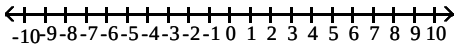
C) $\{x \mid x \le 6\}$



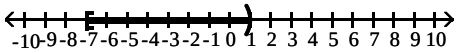
D) $\{x \mid -4 \le x \le 6\}$



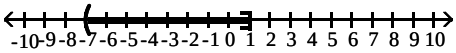
2) $[-7, 1)$



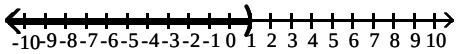
A) $\{x \mid -7 \le x < 1\}$



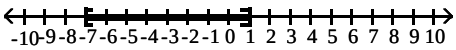
B) $\{x \mid -7 < x \le 1\}$



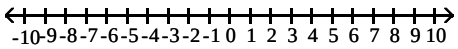
C) $\{x \mid x < 1\}$



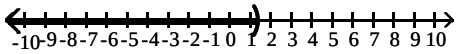
D) $\{x \mid -7 \le x \le 1\}$



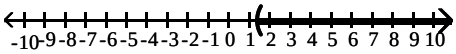
3) $\left(-\infty, \frac{7}{5}\right]$



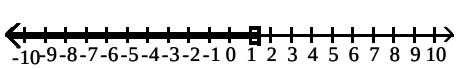
A) $\left\{x \mid x < \frac{7}{5}\right\}$



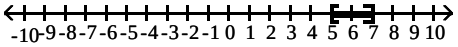
B) $\left\{x \mid x > \frac{7}{5}\right\}$



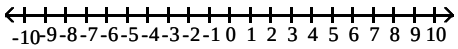
C) $\left\{x \mid x \le \frac{7}{5}\right\}$



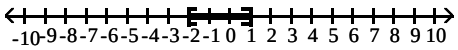
D) $\{x \mid 5 \le x \le 7\}$



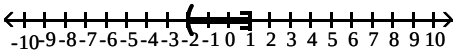
4) $[-2, 1]$



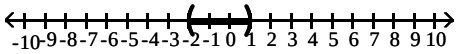
A) $\{x \mid -2 \le x \le 1\}$



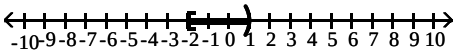
B) $\{x \mid -2 < x \le 1\}$



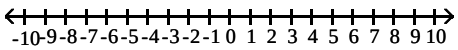
C) $\{x \mid -2 < x < 1\}$



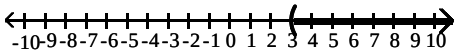
D) $\{x \mid -2 \le x < 1\}$



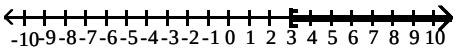
5) $(3, \infty)$



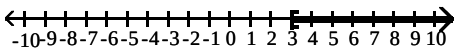
A) $\{x \mid x > 3\}$



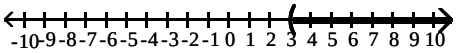
B) $\{x \mid x \ge 3\}$



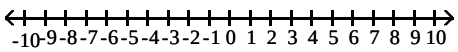
C) $\{x \mid x > 3\}$



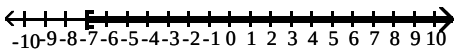
D) $\{x \mid x \ge 3\}$



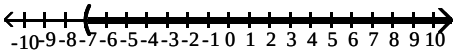
6) $[-7, \infty)$



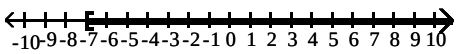
A) $\{x \mid x \ge -7\}$



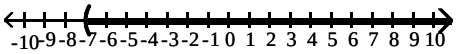
B) $\{x \mid x > -7\}$



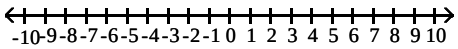
C) $\{x \mid x > -7\}$



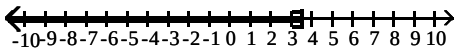
D) $\{x \mid x \ge -7\}$



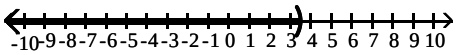
7) $(-\infty, 3.5]$



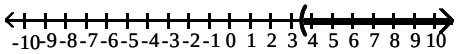
A) $\{x \mid x \leq 3.5\}$



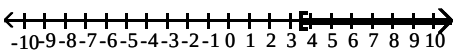
B) $\{x \mid x < 3.5\}$



C) $\{x \mid x > 3.5\}$



D) $\{x \mid x \geq 3.5\}$



2 Find Intersections and Unions of Intervals

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use graphs to find the set.

1) $(-8, 0) \cap [-3, 8]$

A) $[-3, 0)$ B) $(-8, 8]$ C) $(0, 8]$ D) $(-8, -3]$

2) $(-10, 0) \cup [-2, 7]$

A) $(-10, 7]$ B) $[-2, 0)$ C) $(0, 7]$ D) $(-10, -2]$

3) $(-\infty, 5) \cap [-6, 15)$

A) $[-6, 5)$ B) $(-\infty, 15)$ C) $(5, 15)$ D) $(-\infty, -6]$

4) $(-\infty, 3) \cup [-9, 15)$

A) $(-\infty, 15)$ B) $[-9, 3)$ C) $(3, 15)$ D) $(-\infty, -9]$

5) $(1, \infty) \cap [16, \infty)$

A) $[16, \infty)$ B) $(1, \infty)$ C) $(1, 16]$ D) $(-\infty, \infty)$

6) $(1, \infty) \cup [16, \infty)$

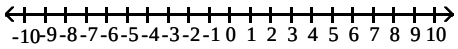
A) $(1, \infty)$ B) $[16, \infty)$ C) $(1, 16]$ D) $(-\infty, \infty)$

3 Solve Linear Inequalities

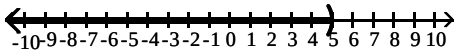
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the linear inequality. Other than ∅, use interval notation to express the solution set and graph the solution set on a number line.

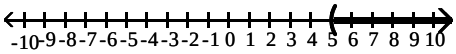
1) $3x + 9 < 24$



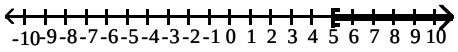
A) $(-\infty, 5)$



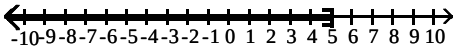
B) $(5, \infty)$



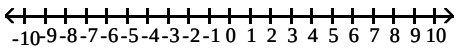
C) $[5, \infty)$



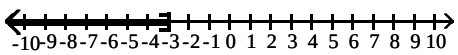
D) $(-\infty, 5]$



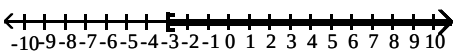
2) $-7x \geq 21$



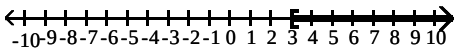
A) $(-\infty, -3]$



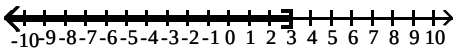
B) $[-3, \infty)$



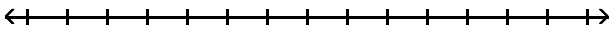
C) $[3, \infty)$



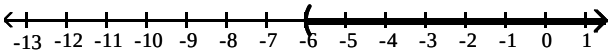
D) $(-\infty, 3]$



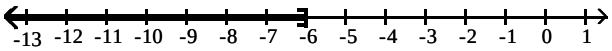
3) $5x - 4 > 4x - 10$



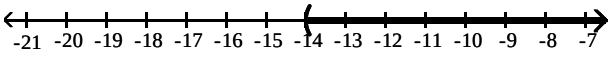
A) $(-6, \infty)$



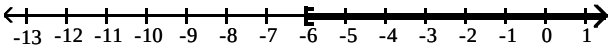
B) $(-\infty, -6]$



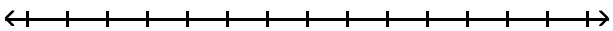
C) $(-14, \infty)$



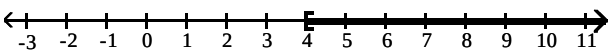
D) $[-6, \infty)$



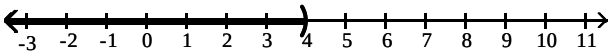
4) $7x - 6 \geq 6x - 2$



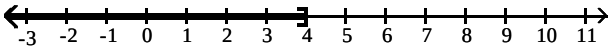
A) $[4, \infty)$



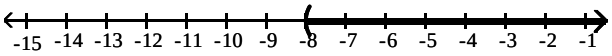
B) $(-\infty, 4)$



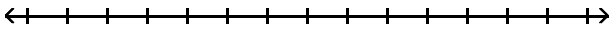
C) $(-\infty, 4]$



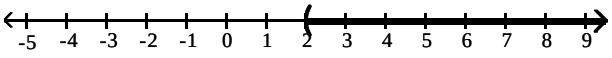
D) $(-8, \infty)$



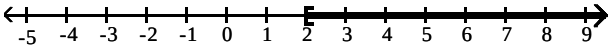
5) $15x + 15 > 3(4x + 7)$



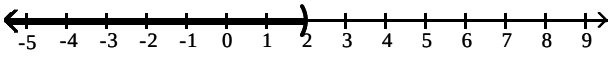
A) $(2, \infty)$



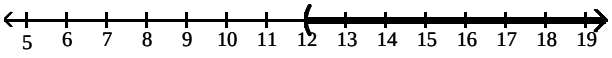
B) $[2, \infty)$



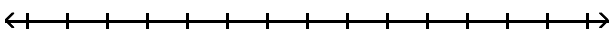
C) $(-\infty, 2)$



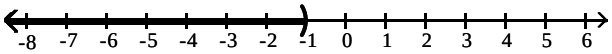
D) $(12, \infty)$



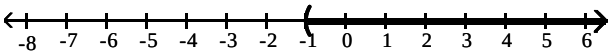
6) $-6(2x + 6) < -18x - 42$



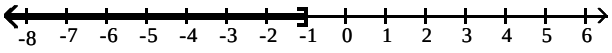
A) $(-\infty, -1)$



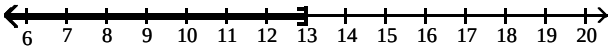
B) $(-1, \infty)$



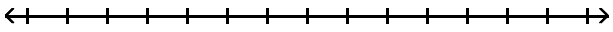
C) $(-\infty, -1]$



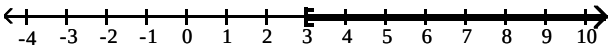
D) $(-\infty, 13]$



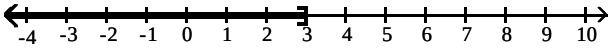
7) $-8x + 4 \le -2(3x + 1)$



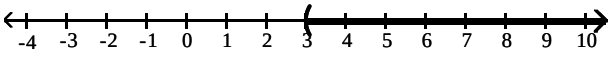
A) $[3, \infty)$



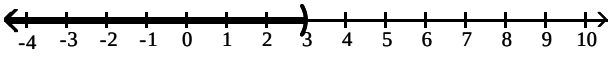
B) $(-\infty, 3]$



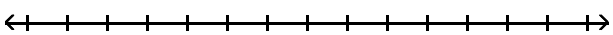
C) $(3, \infty)$



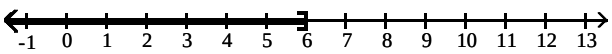
D) $(-\infty, 3)$



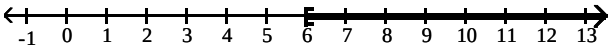
8) $6x + 10 \le 2(2x + 11)$



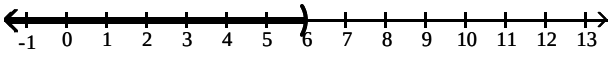
A) $(-\infty, 6]$



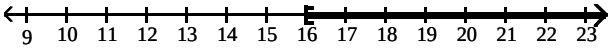
B) $[6, \infty)$



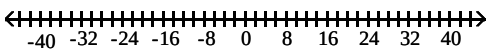
C) $(-\infty, 6)$



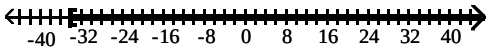
D) $[-\infty, 16)$



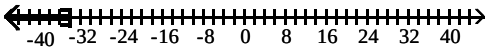
9) $\frac{x}{7} - \frac{2}{3} \le \frac{x}{4} + 3$



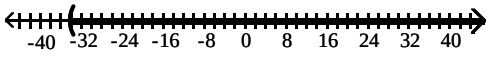
A) $\left[-\frac{308}{9}, \infty\right)$



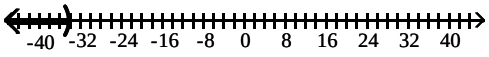
B) $\left(-\infty, -\frac{308}{9}\right]$



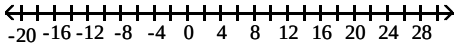
C) $\left(-\frac{308}{9}, \infty\right)$



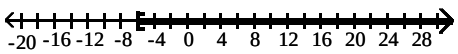
D) $\left(-\infty, -\frac{308}{9}\right)$



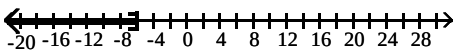
10) $\frac{x-2}{15} \ge \frac{x-5}{20} + \frac{1}{60}$



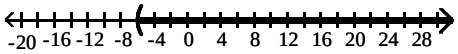
A) $[-6, \infty)$



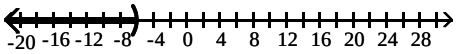
B) $(-\infty, -6]$



C) $(-6, \infty)$



D) $(-\infty, -6)$



Use interval notation to represent all values of x satisfying the given conditions.

11) $y_1 = 7x + 4$, $y_2 = 6x + 10$, and $y_1 > y_2$.

A) $(6, \infty)$ B) $(-\infty, 6]$ C) $(14, \infty)$ D) $[6, \infty)$

12) $y_1 = 4x + 6$, $y_2 = 3x + 10$, and $y_1 \le y_2$.

A) $(-\infty, 4]$ B) $(-\infty, 4)$ C) $[4, \infty)$ D) $[16, \infty)$

13) $y_1 = \frac{x}{2}$, $y_2 = 1 + \frac{x}{4}$, and $y_1 \ge y_2$.

A) $[4, \infty)$ B) $[-4, \infty)$ C) $(-\infty, 4]$ D) $(4, \infty)$

14) $y = 8 - 3(2 - x)$ and y is at most -13.

A) $(-\infty, -5]$ B) $[-5, \infty)$ C) $(-\infty, -4]$ D) $(-\infty, -5)$

15) $y = \frac{x - 2}{8} - \frac{x - 1}{12} - \frac{1}{24}$ and y is at least 0.

A) $[5, \infty)$ B) $(-\infty, 5]$ C) $(5, \infty)$ D) $(-\infty, 5)$

Solve the problem.

16) When making a long distance call from a certain pay phone, the first three minutes of a call cost \$2.95. After that, each additional minute or portion of a minute of that call costs \$0.20. Use an inequality to find the number of minutes one can call long distance for \$6.95.

A) 23 minutes or fewer B) 20 minutes or fewer

C) 2 minutes or fewer D) 35 minutes or fewer

17) It takes 24 minutes to set up a candy making machine. Once the machine is set up, it produces 30 candies per minute. Use an inequality to find the number of candies that can be produced in 7 hours if the machine has not yet been set up.

A) 11,880 candies or fewer B) 210 candies or fewer

C) 9360 candies or fewer D) 5040 candies or fewer

18) A certain store has a fax machine available for use by its customers. The store charges \$2.20 to send the first page and \$0.50 for each subsequent page. Use an inequality to find the number of pages that can be faxed for \$8.20.

A) 13 pages or fewer B) 56 pages or fewer C) 4 pages or fewer D) 16 pages or fewer

19) Claire has received scores of 85, 88, 87, and 75 on her algebra tests. What score must she receive on the fifth test to have an overall test score average of at least 83?

A) 80 or greater B) 81 or greater C) 79 or greater D) 78 or greater

20) Using data from 1996–1998, the annual number of cars sold at a certain dealership can be modeled by the formula

$y = 4x + 5$,

where y is the number of cars, in thousands, sold x years after 1996. According to this formula, in which years will the number of cars sold exceed 53 thousand?

A) Years after 2008 B) Years after 2006 C) Years after 2010 D) Years after 2012

21) ABC phone company charges \$17 per month plus 9¢ per minute of phone calls. XYZ phone company charges \$13 per month plus 11¢ per minute of phone calls. How many minutes of phone calls in a month make XYZ phone company the better deal?

A) Less than 200 minutes B) More than 200 minutes

C) More than 20 minutes D) Less than 20 minutes

22) Greg is opening a car wash. He estimates his cost equation as $C = 6000 + 0.06x$ and his revenue equation as $R = 1.85x$, where x is the number of cars washed in a six–month period. Find the number of cars that must be washed in a six–month period for Greg to make a profit.

A) At least 3352 cars B) At least 336 cars C) At least 33,520 cars D) At least 2352 cars

23) A standard train ticket in a certain city costs \$2.00 per ride. People who use the train also have the option of purchasing a frequent–rider pass for \$18.00 each month. With the pass, a ticket costs only \$1.25 per ride. How many train rides in a month make the frequent–rider pass a better deal than standard train tickets?

A) 25 or more rides B) 24 or more rides C) 23 or more rides D) 26 or more rides

24) Every Sunday, Jarod buys a loaf of fresh bread for his family from the corner bakery for \$3.00. The local department store has a sale on breadmakers for \$89. If the bread–making supplies cost \$0.67 per week, for how many weeks would Jarod have to bake a loaf of bread at home before the breadmaker starts saving him money?

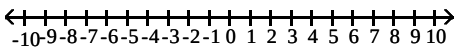
A) At least 39 weeks B) At least 38 weeks C) At least 41 weeks D) At least 40 weeks

4 Recognize Inequalities with No Solution or All Real Numbers as Solutions

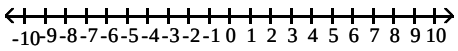
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the linear inequality. Other than ∅, use interval notation to express the solution set and graph the solution set on a number line.

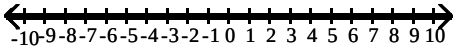
1) $5(4x + 2) - 4x < 4(3 + 4x) - 6$



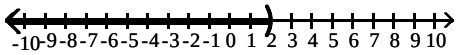
A) ∅



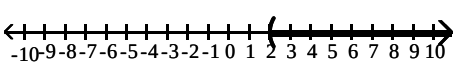
B) $(-\infty, \infty)$



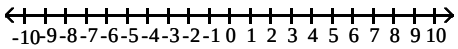
C) $(-\infty, 2)$



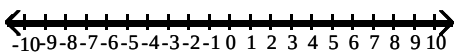
D) $(2, \infty)$



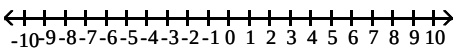
2) $4(x + 7) \geq 3(x - 6) + x$



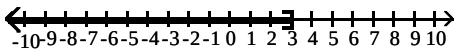
A) $(-\infty, \infty)$



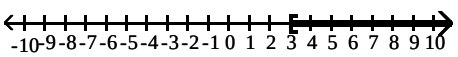
B) $\emptyset$



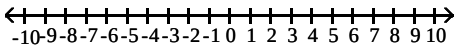
C) $(-\infty, 3]$



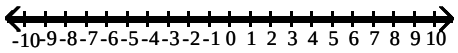
D) $[3, \infty)$



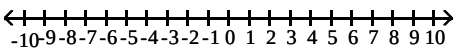
3) $-4x \leq -4(x - 5)$



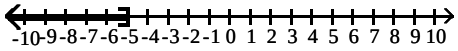
A) $(-\infty, \infty)$



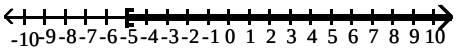
B) $\emptyset$



C) $(-\infty, -5]$



D) $[-5, \infty)$

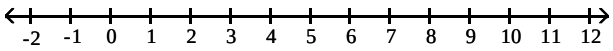


5 Solve Compound Inequalities

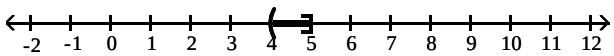
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the compound inequality. Other than $\emptyset$, use interval notation to express the solution set and graph the solution set on a number line.

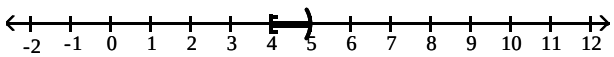
1) $16 < 4x \leq 20$



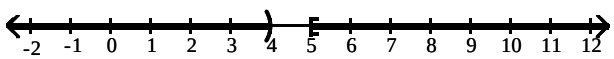
A) (4, 5]



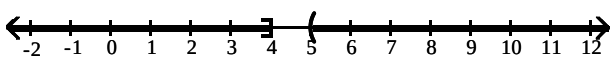
B) [4, 5)



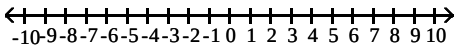
C) $(-\infty, 4) \cup [5, \infty)$



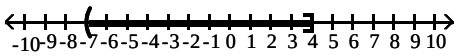
D) $(-\infty, 4] \cup (5, \infty)$



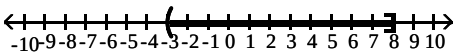
2) $-5 < x + 2 \leq 6$



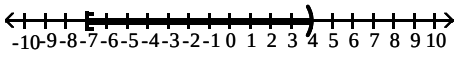
A) (–7, 4]



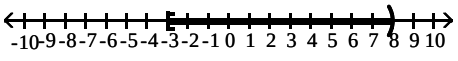
B) (–3, 8]



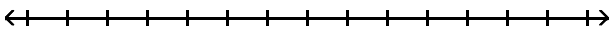
C) [–7, 4)



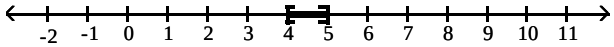
D) [–3, 8)



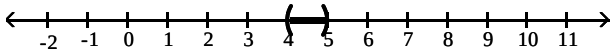
3) $17 \leq 5x - 3 \leq 22$



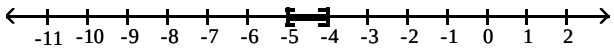
A) [4, 5]



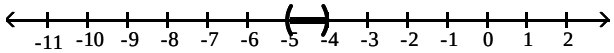
B) (4, 5)



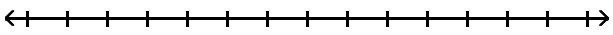
C) [–5, –4]



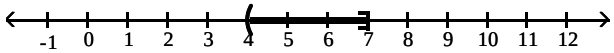
D) (–5, –4)



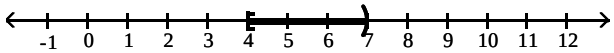
4) $-17 \leq -2x - 3 < -11$



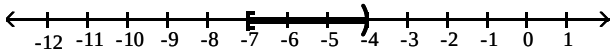
A) (4, 7]



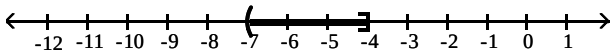
B) [4, 7)



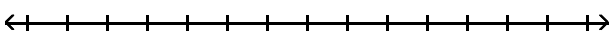
C) [–7, –4)



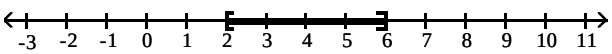
D) (–7, –4]



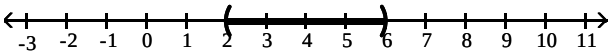
5) $-14 \le -2x - 2 \le -6$



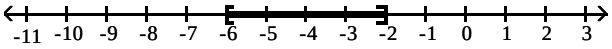
A) [2, 6]



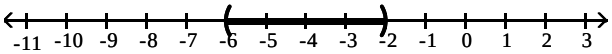
B) (2, 6)



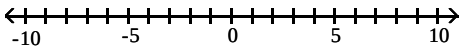
C) [−6, −2]



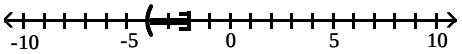
D) (−6, −2)



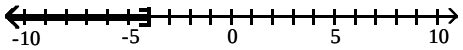
6) $-4 \le -4x - 12 < 4$



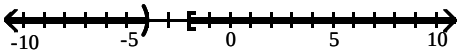
A) (−4, −2]



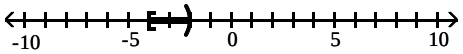
B) $(-\infty, -4]$



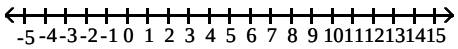
C) $(-\infty, -4)$ or $[-2, \infty)$



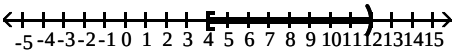
D) [−4, −2)



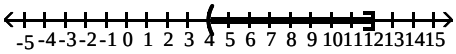
7) $14 \le \frac{9}{4}x + 5 < 32$



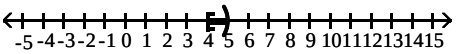
A) [4, 12)



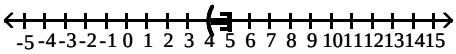
B) (4, 12]



C) [4, 5)



D) (4, 5]



Solve the problem.

8) The formula for converting Fahrenheit temperature, F, to Celsius temperature, C, is

$$C = \frac{5}{9}(F - 32).$$

If Celsius temperature ranges from –15° to 55°, inclusive, what is the range for the Fahrenheit temperature?

A) [5°F, 131°F] B) (5°F, 131°F) C) [–19°F, –12°F] D) (–19°F, –12°F)

9) The formula for converting Celsius temperature, C, to Fahrenheit temperature, F, is

$$F = \frac{9}{5}C + 32.$$

If Fahrenheit temperature ranges from 86° to 176°, inclusive, what is the range for the Celsius temperature?

A) [30°C, 80°C] B) (30°C, 80°C)

C) [187°C, 349°C] D) (187°C, 349°C)

10) On the first four exams, your grades are 75, 92, 57, and 76. You are hoping to earn a C in the course. This will occur if the average of your five exam grades is greater than or equal to 70 and less than 80. What range of grades on the fifth exam will result in earning a C?

A) [50, 100) B) (50, 100] C) [40, 90) D) (40, 90]

11) On the first four exams, your grades are 77, 96, 57, and 78. There is still a final exam, and it counts as two grades. You are hoping to earn a C in the course. This will occur if the average of your six exam grades is greater than or equal to 70 and less than 80. What range of grades on the final exam will result in earning a C?

A) [56, 86) B) [56, 86] C) [42, 92) D) [42, 92]

12) Parts for an automobile repair cost $351. The mechanic charges $27 per hour. If you receive an estimate for at least $486 and at most $594 for fixing the car, what is the time interval, in hours, that the mechanic will be working on the job?

A) [5, 9] B) [18, 22] C) [1, 9] D) [1, 5]

13) The formula $C = 2x + 16$ represents the estimated future cost of yearly attendance at State University, where C is the cost in thousands of dollars x years after 2002. Use a compound inequality to determine when the attendance costs will range from 32 to 40 thousand dollars.

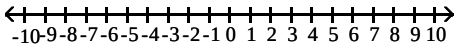
A) From 2010 to 2014 B) From 2009 to 2013 C) From 2011 to 2015 D) From 2011 to 2013

6 Solve Absolute Value Inequalities

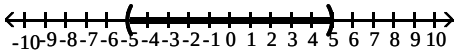
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the absolute value inequality. Other than ∅, use interval notation to express the solution set and graph the solution set on a number line.

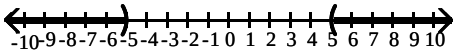
1) $|x| < 5$



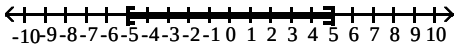
A) (–5, 5)



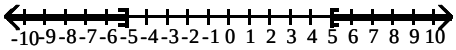
B) (–∞, –5) ∪ (5, ∞)



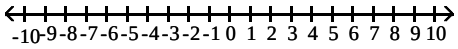
C) [–5, 5]



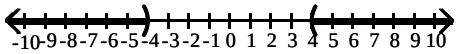
D) (–∞, –5] ∪ [5, ∞)



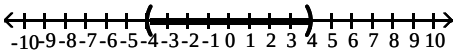
2) $|x| > 4$



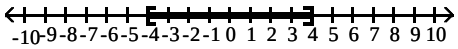
A) (–∞, –4) ∪ (4, ∞)



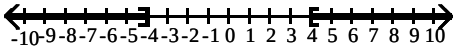
B) (–4, 4)



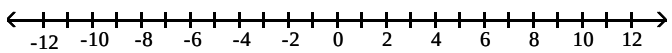
C) [–4, 4]



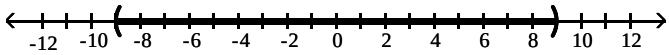
D) (–∞, –4] ∪ [4, ∞)



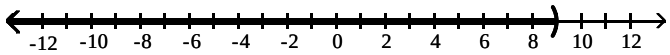
3) $|x - 9| < 0$



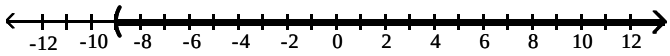
A) (–9, 9)



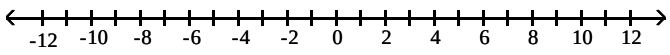
B) (–∞, 9)



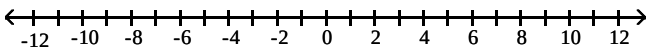
C) (–9, ∞)



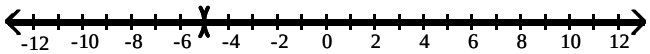
D) ∅



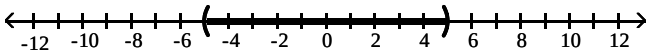
4) $|x + 5| > 0$



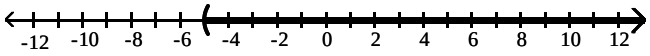
A) $(-\infty, -5) \cup (-5, \infty)$



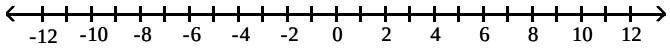
B) $(-5, 5)$



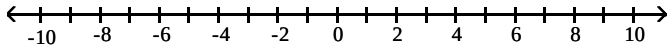
C) $(-5, \infty)$



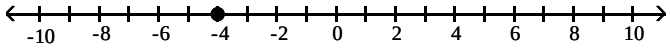
D) $\emptyset$



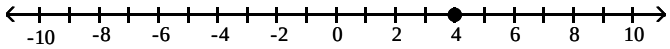
5) $|x + 4| \leq 0$



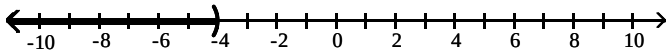
A) $\{-4\}$



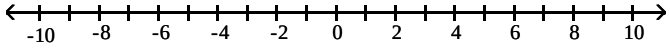
B) $\{4\}$



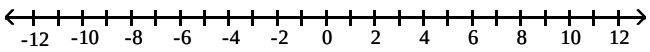
C) $(-\infty, -4)$



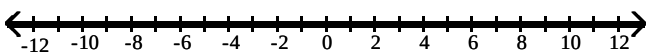
D) $\emptyset$



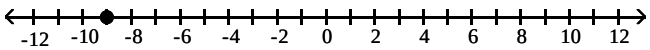
6) $|x + 9| \geq 0$



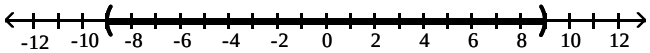
A) $(-\infty, \infty)$



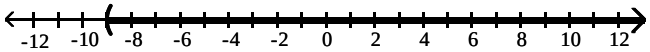
B) $\{-9\}$



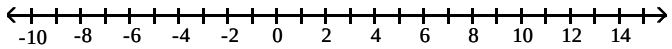
C) $(-9, 9)$



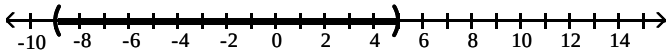
D) $(-9, \infty)$



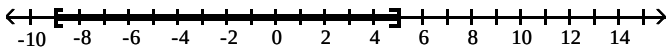
7) $|x + 2| < 7$



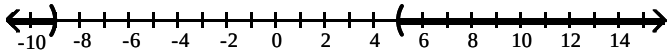
A) $(-9, 5)$



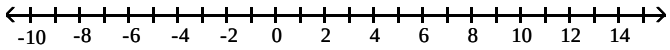
B) $[-9, 5]$



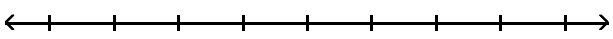
C) $(-\infty, -9) \cup (5, \infty)$



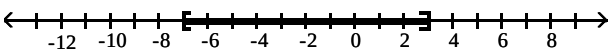
D) $\varnothing$



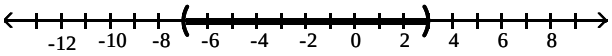
8) $|x + 2| + 6 \le 11$



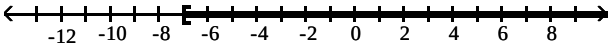
A) [–7, 3]



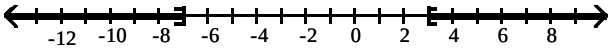
B) (–7, 3)



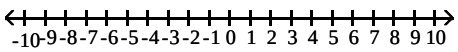
C) [–7, 11]



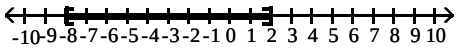
D) $(-\infty, -7] \cup [3, \infty)$



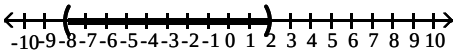
9) $|\, 3(x + 1) + 6 \,| \le 15$



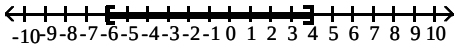
A) [–8, 2]



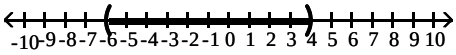
B) (–8, 2)



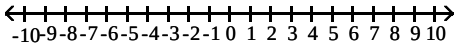
C) [–6, 4]



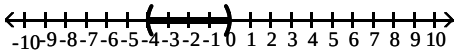
D) (–6, 4)



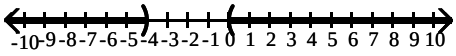
10) $\left|\dfrac{11y + 22}{2}\right| < 11$



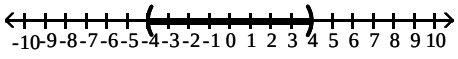
A) (–4, 0)



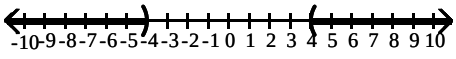
B) $(-\infty, -4) \cup (0, \infty)$



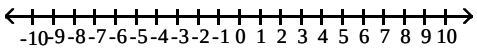
C) (–4, 4)



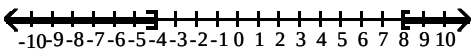
D) $(-\infty, -4) \cup (4, \infty)$



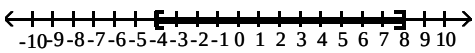
11) $5 + \left|1 - \frac{x}{2}\right| \geq 8$



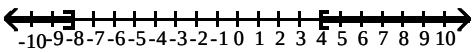
A) $(-\infty, -4] \cup [8, \infty)$



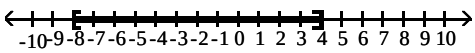
B) $[-4, 8]$



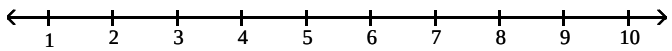
C) $(-\infty, -8] \cup [4, \infty)$



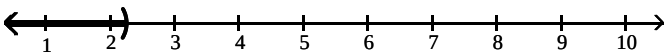
D) $[-8, 4]$



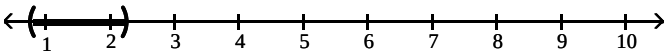
12) $|4x - 6| - 2 < -5$



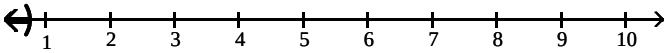
A) $\left(-\infty, \frac{9}{4}\right)$



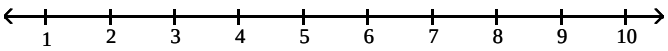
B) $\left(\frac{3}{4}, \frac{9}{4}\right)$



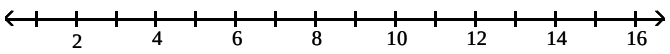
C) $\left(-\infty, \frac{3}{4}\right)$



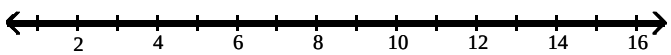
D) $\emptyset$



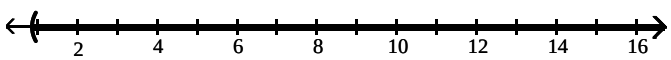
13) $|7x - 9| - 3 > -6$



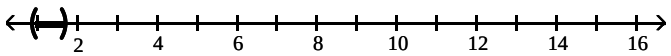
A) $(-\infty, \infty)$



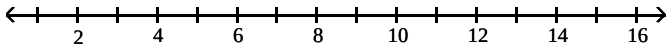
B) $\left(\frac{6}{7}, \infty\right)$



C) $\left(\frac{6}{7}, \frac{12}{7}\right)$



D) $\emptyset$



Solve the problem.

14) A spinner has five regions numbered 1 through 5. If the spinner is spun 100 times, we would expect about 20 of the outcomes to be Region 1. It can be determined that the spinner is unbalanced if x, the number of outcomes that result in Region 1, satisfies $\left|\frac{x - 20}{4}\right| \geq 1.645$. Describe the number of outcomes that determine an unbalanced spinner that is spun 100 times.

A) Fewer than 14 or more than 26 outcomes
B) Between 14 and 26 outcomes
C) Fewer than 17 or more than 29 outcomes
D) Between 17 and 29 outcomes

15) When a number is subtracted from –7, the absolute value of the difference is more than 3. Use interval notation to express the set of all numbers that satisfy this condition.

A) $(-\infty, -10) \cup (-4, \infty)$
B) $(-\infty, -4) \cup (10, \infty)$
C) $(-\infty, -10] \cup [-4, \infty)$
D) $(-10, -4)$

16) A landscaping company sells 40–pound bags of top soil. The actual weight x of a bag, however, may differ from the advertised weight by as much as 0.75 pound. Write an inequality involving absolute value that expresses the relationship between the actual weight x of a bag and 40 pounds. Solve the inequality, and express the answer in interval form.

A) $|40 - x| \leq 0.75$; [39.25, 40.75]
B) $|40 + x| \leq 0.75$; [39.25, 40.75]
C) $|x + 0.75| \leq 40$; [39.25, ∞)
D) $|x| - 40 \leq 0.75$; $(-\infty, 40.75]$

Ch. 1 Equations and Inequalities
Answer Key

1.1 Graphs and Graphing Utilities

1 Plot Points in the Rectangular Coordinate System

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A

2 Graph Equations in the Rectangular Coordinate System

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) A
10) A
11) A

3 Interpret Information About a Graphing Utility's Viewing Rectangle or Table

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A

4 Use a Graph to Determine Intercepts

1) A
2) A
3) A
4) A
5) A
6) A
7) A

5 Interpret Information Given by Graphs

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) A

1.2 Linear Equations and Rational Equations

1 Solve Linear Equations in One Variable

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) A
10) A
11) A

2 Solve Linear Equations Containing Fractions

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) A

3 Solve Rational Equations with Variables in the Denominators

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) A
10) A
11) D
12) A

4 Recognize Identities, Conditional Equations, and Inconsistent Equations

1) A
2) B
3) C
4) B
5) A
6) C
7) A
8) C
9) B
10) B
11) C

5 Solve Applied Problems Using Mathematical Models

1) A
2) A
3) A
4) A
5) A

6) A
7) A
8) A

1.3 Models and Applications

1 Use Linear Equations to Solve Problems

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) D
10) A
11) A
12) A
13) A
14) A
15) A
16) A
17) A
18) A
19) A
20) A
21) A
22) A
23) A
24) A
25) A
26) A

2 Solve a Formula for a Variable

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) A
10) A
11) A
12) A
13) A
14) A

1.4 Complex Numbers

1 Add and Subtract Complex Numbers

1) A
2) A
3) A
4) A
5) A
6) A

7) A

2 Multiply Complex Numbers

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) A
10) A
11) A
12) A

3 Divide Complex Numbers

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) A
10) A
11) A

4 Perform Operations with Square Roots of Negative Numbers

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) A
10) A
11) A
12) A

1.5 Quadratic Equations

1 Solve Quadratic Equations by Factoring

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A

2 Solve Quadratic Equations by the Square Root Property

1) A
2) A
3) A
4) A

5) A
6) A
7) A
8) A
9) A
10) A
11) A

3 Solve Quadratic Equations by Completing the Square

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) A
10) A
11) A
12) A
13) A
14) A
15) A
16) A

4 Solve Quadratic Equations Using the Quadratic Formula

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A

5 Use the Discriminant to Determine the Number and Type of Solutions

1) A
2) A
3) A

6 Determine the Most Efficient Method to Use When Solving a Quadratic Equation

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) A
10) A
11) A
12) A
13) A
14) A
15) A
16) A

17) A
18) A
19) A
20) A
21) A
22) A
23) A
24) A
25) A
26) A

7 Solve Problems Modeled by Quadratic Equations

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) A
10) A

1.6 Other Types of Equations

1 Solve Polynomial Equations by Factoring

1) A
2) A
3) A
4) A
5) A
6) A
7) A

2 Solve Radical Equations

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) A
10) A
11) A
12) A
13) A
14) A
15) A
16) A
17) $V = \frac{\pi r^2 h}{3}$
18) $\theta = \frac{2A}{r^2}$

3 Solve Equations with Rational Exponents

1) A

2) A
3) A
4) A
5) A
6) A
7) A
8) A

4 Solve Equations That Are Quadratic in Form

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) A
10) A
11) A
12) A
13) A
14) A
15) A
16) A
17) A
18) A
19) A
20) A
21) A
22) A
23) A
24) A
25) A
26) A
27) A
28) A
29) A
30) A
31) A
32) A
33) A
34) A
35) A

5 Solve Equations Involving Absolute Value

1) A
2) A
3) A
4) A
5) A
6) A
7) D
8) A
9) A
10) A

11) A
12) A
13) A
14) A
15) A
16) A
17) A

6 Solve Problems Modeled by Equations

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) A
10) A
11) A
12) A
13) A

1.7 Linear Inequalities and Absolute Value Inequalities

1 Use Interval Notation

1) A
2) A
3) A
4) A
5) A
6) A
7) A

2 Find Intersections and Unions of Intervals

1) A
2) A
3) A
4) A
5) A
6) A

3 Solve Linear Inequalities

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) A
10) A
11) A
12) A
13) A
14) A
15) A
16) A

17) A
18) A
19) A
20) A
21) A
22) A
23) A
24) A

4 Recognize Inequalities with No Solution or All Real Numbers as Solutions

1) A
2) A
3) A

5 Solve Compound Inequalities

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) A
10) A
11) A
12) A
13) A

6 Solve Absolute Value Inequalities

1) A
2) A
3) D
4) A
5) A
6) A
7) A
8) A
9) A
10) A
11) A
12) D
13) A
14) A
15) A
16) A