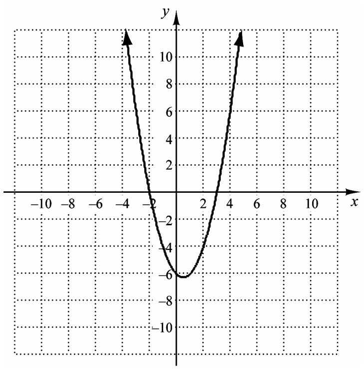
CHAPTER 2, FORM A

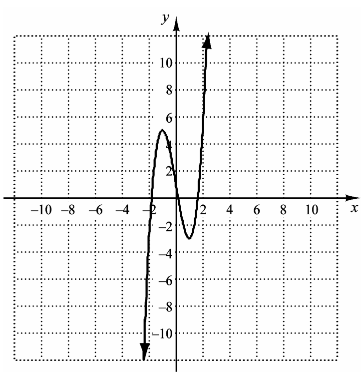
1. Relative minimum: $-\frac{25}{4}$ at $x=\frac{1}{2}$; decreasing on $(-\infty,\frac{1}{2})$; increasing on $(\frac{1}{2},\infty,)$

$f(x)=x^2-x-6$



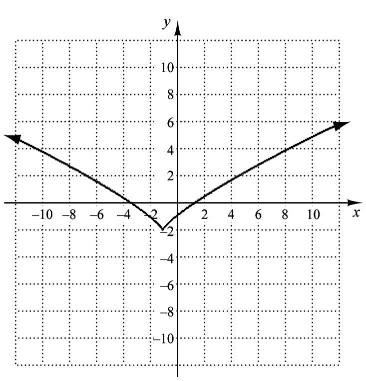
2. Relative maximum: 5 at $x=-1$; relative minimum: −3 at $x = 1$; decreasing on (−1, 1) increasing on $(-\infty,-1)$ and $(1,\infty)$

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

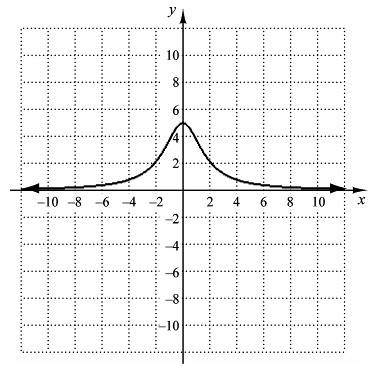


3. Relative minimum: −2 at $x=-1$; decreasing on (−∞, −1); increasing on (−1, ∞)

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

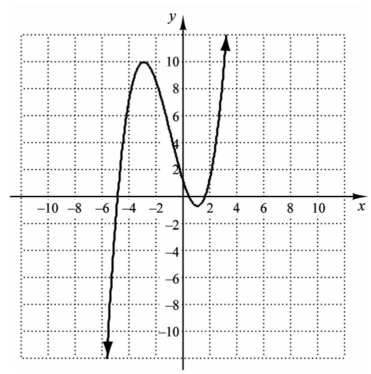


4. Relative maximum: 5 at $x=0$; decreasing on $(0,\infty)$; increasing on $(-\infty,0)$ $f(x)=\dfrac{15}{x^2+3}$



5. Relative maximum: 10 at $x=-3$; relative minimum: $-\frac{2}{3}$ at $x=1$; inflection point: $(-1,\frac{14}{3})$

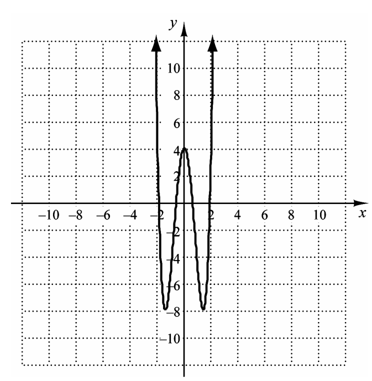
$$f(x)=\frac{x^3}{3}+x^2-3x+1$$



6. Relative maximum: 4 at $x = 0$; relative minima: −8 at $x=-\sqrt{2}$ and $\sqrt{2}$; inflection points:

$$\left(-\sqrt{\frac{2}{3}},-\frac{8}{3}\right) \text{ and } \left(\sqrt{\frac{2}{3}},-\frac{8}{3}\right)$$

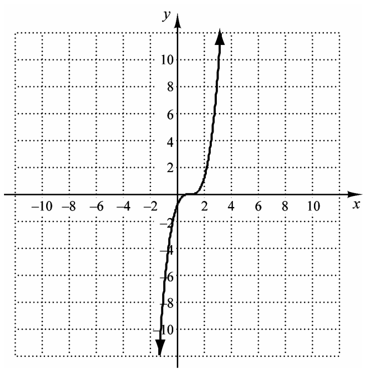
$f(x)=3x^4-12x^2+4$



CHAPTER 2, FORM A (continued)

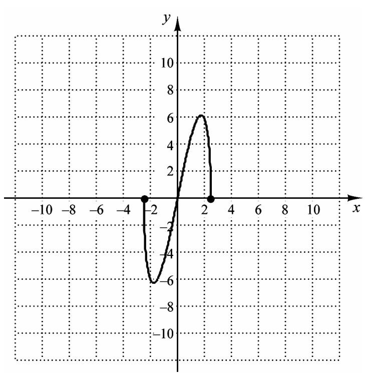
7. No relative extrema; inflection point: (1, 0)

$f(x) = (x-1)^3$



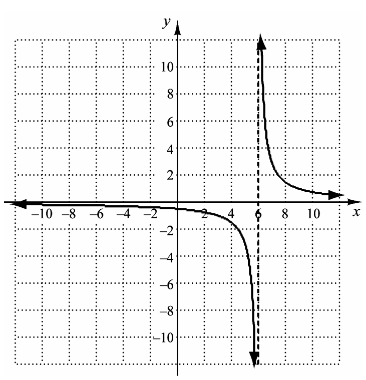
8. Relative maximum: $\frac{25}{4}$ at $x = \sqrt{\frac{25}{8}}$; relative minimum: $-\frac{25}{4}$ at $x = \sqrt{\frac{25}{8}}$; inflection point: (0, 0)

$f(x) = x\sqrt{25-4x^2}$



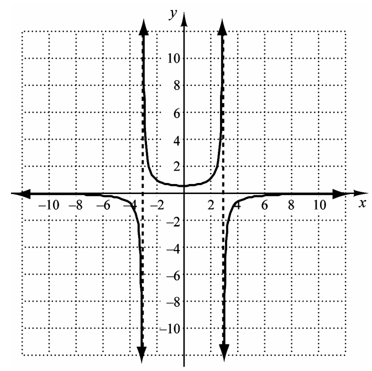
9. No relative extrema; asymptotes: $x = 6$ and $y = 0$

$$f(x) = \frac{3}{x-6}$$



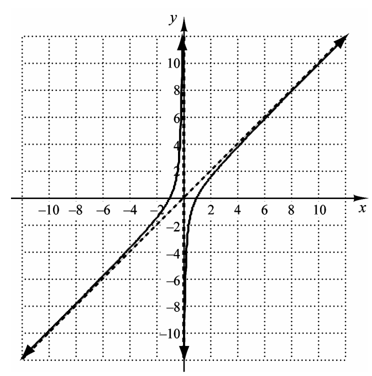
10. Relative minimum: $\frac{5}{9}$ at $x = 0$; asymptotes: $x = -3$, $x = 3$, $y = 0$

$$y = \frac{-5}{x^2 - 9}$$



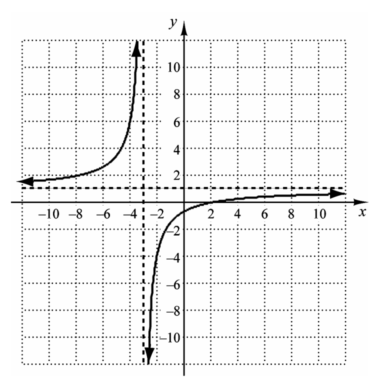
11. No relative extrema; asymptotes: $x = 0$ and $y = x$

$$f(x) = \frac{x^2 - 1}{x}$$



12. No relative extrema; asymptotes: $x = -3$ and $y = 1$

$$f(x) = \frac{x-2}{x+3}$$



CHAPTER 2, FORM A (continued)

13. Absolute maximum: $\frac{121}{4}$ at $x=\frac{11}{2}$; no absolute minimum

14. Absolute maximum: 0 at $x=-1$; absolute minimum: -13 at $x=-2$

15. Absolute maximum: 10.56 at $x = 1.6$; no absolute minimum

16. Absolute minimum: -7 at $x=-2$; absolute maximum: 9 at $x = 2$

17. There are no absolute extrema.

18. No absolute maximum; absolute minimum: $-\frac{1}{8}$ at $x=\frac{3}{8}$

19. No absolute maximum; absolute minimum: 3 at $x = 1$

20. 6 and -6

21. $x=\frac{8}{3}$; $y=-\frac{4}{3}$; $Q=\frac{32}{3}$

22. Maximum profit: \$12,240; 175 units

23. 32 in. by 32 in. by 8 in.; 8192 in^3

24. 5 times per year at lot size 20

25. $\Delta y=-0.39$; $f'(x)\Delta x=-0.4$

26. 6.7143

27. **(a)** $\frac{x\,dx}{\sqrt{x^2+5}}$

(b) 0.0080178

28. $\frac{10x}{3y^2}$; $\frac{20}{27}$

29. $\pm 542.592\ \text{cm}^3$

30. The top of the ladder is moving at -0.24 ft/sec

31. Absolute maximum: 0 at $x = 0$; absolute minimum: $\frac{-5\sqrt[3]{4}}{3}$ at $x=\sqrt[3]{2}$

32. 2,500 units

33. Absolute minimum: -58.70 at $x = 4.19$; relative maximum: 17.55 at $x = 0.83$

34. **(a)** Linear: $y=-0.1528571429x$
$+8897.928571$;

Quadratic: $y=-0.696752381x^2$
$+208.8728571x+188.5238095$

Cubic: $y=-0.000037x^3-0.680052381x^2$
$+207.0173016x+216.3571429$

Quartic:
$y=-0.00000298x^4-0.0017501616x^3$
$-1.010910606x^2+225.8474964x$
$+120.6103896$

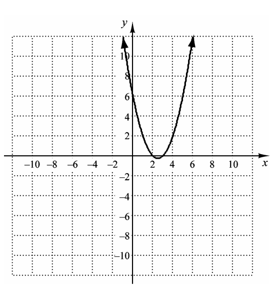
(b) $[0,300]$

(c) The maximum value is 15,842 tennis racquets and the company should spend \$150,000 on advertising.

CHAPTER 2, FORM B

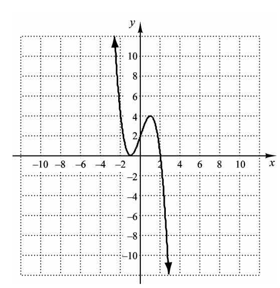
1. Relative minimum: $-\frac{1}{4}$ at $x=\frac{5}{2}$; decreasing on $(-\infty,\frac{5}{2})$; increasing on $(\frac{5}{2},\infty)$

$f(x)=x^2-5x+6$



2. Relative maximum: 4 at $x = 1$; relative minimum: 0 at $x=-1$; decreasing on $(-\infty,-1)$ and $(1,\infty)$; increasing on $(-1,1)$

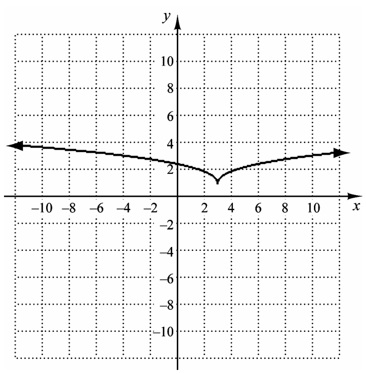
$f(x)=2+3x-x^3$



CHAPTER 2, FORM B (continued)

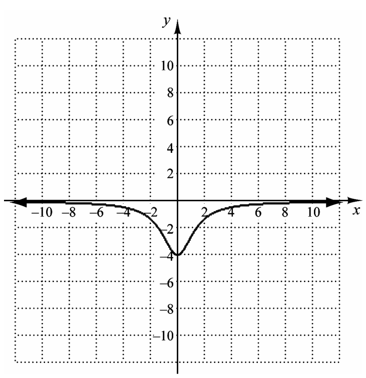
3. Relative minimum: 1 at $x = 3$; decreasing on $(-\infty, 3)$; increasing on $(3, \infty)$

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



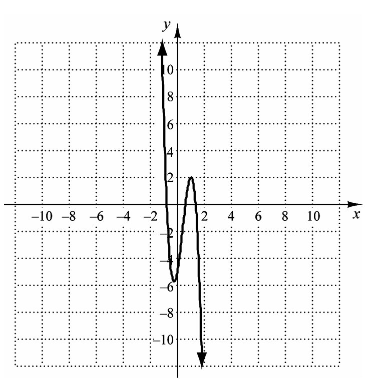
4. Relative minimum: -4 at $x = 0$; decreasing on $(-\infty, 0)$; increasing on $(0, \infty)$

$$f(x) = \frac{-8}{x^2 + 2}$$



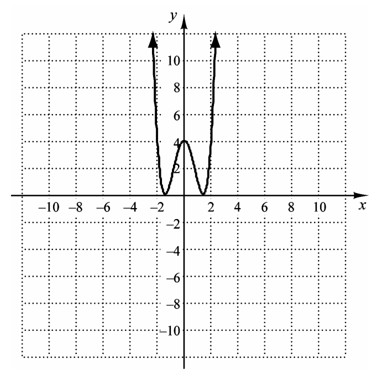
5. Relative maximum: 2 at $x = 1$; relative minimum: $-\frac{93}{16}$ at $x = -\frac{1}{4}$; inflection point: $(\frac{3}{8}, -\frac{61}{32})$

$f(x) = -8x^3 + 9x^2 + 6x - 5$



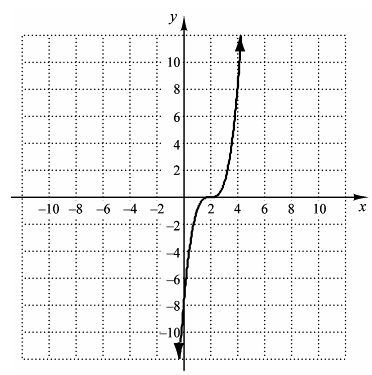
6. Relative maximum: 4 at $x = 0$; relative minima: 0 at $x = -\sqrt{2}$ and $x = \sqrt{2}$; inflection points: $(-\sqrt{\frac{2}{3}}, \frac{16}{9})$ and $(\sqrt{\frac{2}{3}}, \frac{16}{9})$

$f(x) = x^4 - 4x^2 + 4$



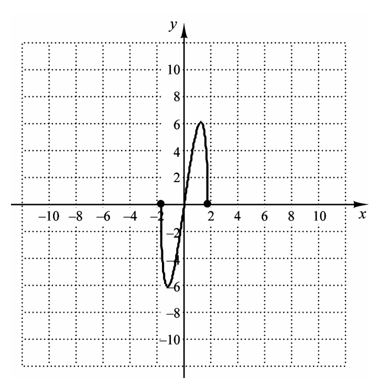
7. No relative extrema; inflection point: (2,0)

$f(x) = (x-2)^3$



8. Relative maximum: $\frac{49}{8}$ at $x = \sqrt{\frac{49}{32}}$; relative minimum: $-\frac{49}{8}$ at $-\sqrt{\frac{49}{32}}$; inflection point: (0, 0)

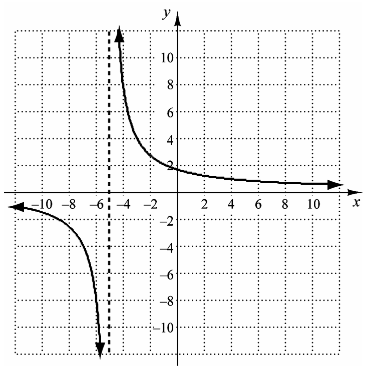
$f(x) = x\sqrt{49 - 16x^2}$



CHAPTER 2, FORM B (continued)

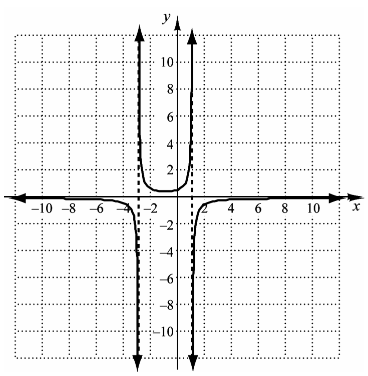
9. No relative extrema; asymptotes: $x = -5$ and $y = 0$

$$f(x) = \frac{8}{x+5}$$



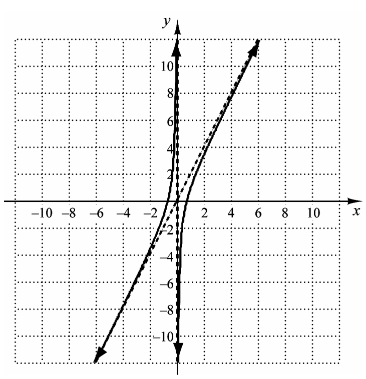
10. Relative minimum: $\frac{1}{2}$ at $x = -1$; asymptotes: $x = -3$, $x = 1$, $y = 0$

$$y = \frac{-2}{x^2 + 2x - 3}$$



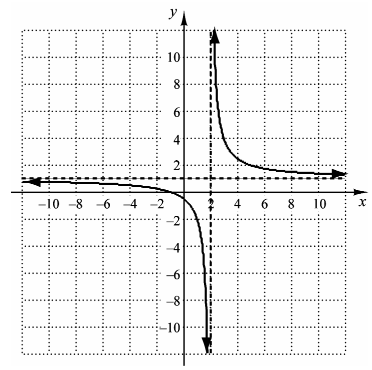
11. No relative extrema; asymptotes: $x = 0$ and $y = 2x$

$$f(x) = \frac{2x^2 - 1}{x}$$



12. No relative extrema; asymptotes: $x = 2$ and $y = 1$

$$f(x) = \frac{x+1}{x-2}$$



13. Absolute maximum: 4 at $x = 2$; no absolute minimum

14. Absolute maximum: 8 at $x = -2$; absolute minimum: -18 at $x = -4$

15. Absolute maximum: 12.84 at $x = -2.8$; no absolute minimum

16. Absolute maximum: 7 at $x = -2$; absolute minimum: -1 at $x = 2$

17. There are no absolute extrema.

18. No absolute maximum; absolute minimum: $-\frac{16}{5}$ at $x = \frac{1}{5}$

19. No absolute maximum; absolute minimum: 27 at $x = 3$

20. -10 and 10

21. $x = 1$; $y = 3$; $Q = 12$

22. Maximum profit: \$11,950; 200 units

23. 48 in. by 48 in. by 12 in.; 27,648 in^3

24. 25 times per year at lot size 100

25. $\Delta y = -0.99$; $f'(x)\Delta x = -1$

26. 6.3333

27. **(a)** $\dfrac{x\,dx}{\sqrt{x^2+6}}$;

(b) 0.0063246

28. $\dfrac{2x}{3y^2}; \dfrac{1}{2}$

CHAPTER 2, FORM B (continued)

29. $\pm 90.432\ \text{cm}^2$

30. The top of the ladder is moving at -0.24 ft/sec

31. Absolute maximum: $\frac{4}{3}\cdot 2^{2/3}$ at $x=-\sqrt[3]{2}$;
absolute minimum: 0 at $x=0$

32. 14,400 units

33. Absolute minimum: -28.95 at $x = 3.77$; relative maximum: 18.14 at $x = 0.91$.

34. (a) Linear: $y=-7.921428571x+12005.17857$;

Quadratic: $y=-3.853352381x^2+585.9242857x-36.54761905$

Cubic: $y=-0.006496x^3-2.391752381x^2+504.7242857x+572.452381$

Quartic:
$y=-0.0002468267x^4+0.067552x^3-9.2456x^2+699.7614286x+76.59523809$

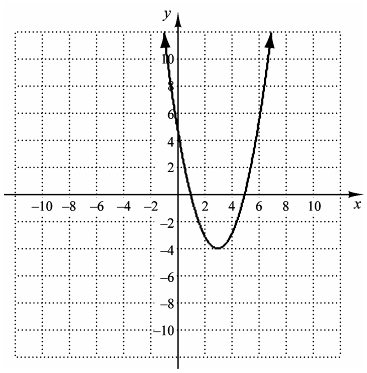
(b) [0, 150]

(c) The maximum value is 22,236 drivers and the company should spend about $76,000 on advertising.

CHAPTER 2, FORM C

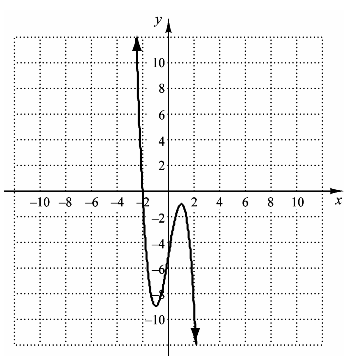
1. Relative minimum: -4 at $x = 3$; decreasing on $(-\infty,3)$; increasing on $(3,\infty)$

$f(x)=x^2-6x+5$



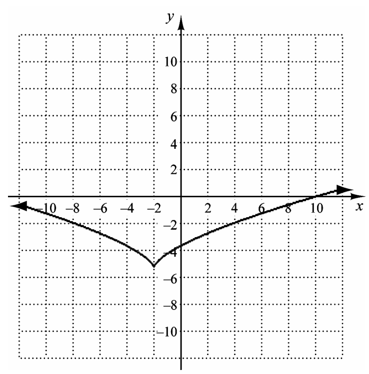
2. Relative maximum: -1 at $x = 1$; relative minimum: -9 at $x=-1$; decreasing on $(-\infty,-1)$ and $(1,\infty)$; increasing on $(-1,1)$

$f(x)=-5+6x-2x^3$



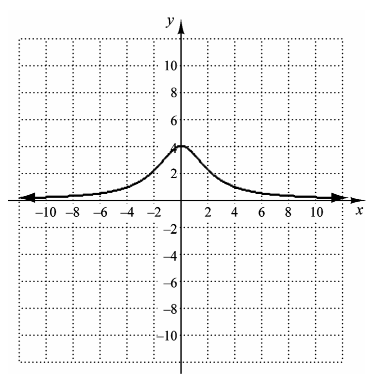
3. Relative minimum: -5 at $x=-2$; decreasing on $(-\infty,-2)$; increasing on $(-2,\infty)$

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



4. Relative maximum: 4 at $x = 0$; decreasing on $(0,\infty)$; increasing on $(-\infty,0)$

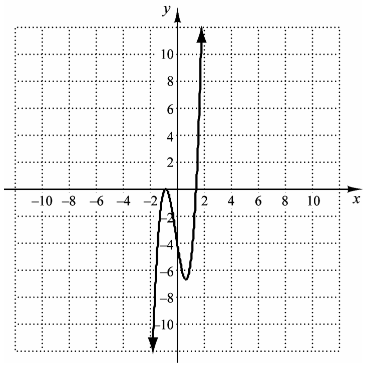
$f(x)=\dfrac{20}{x^2+5}$



CHAPTER 2, FORM C (continued)

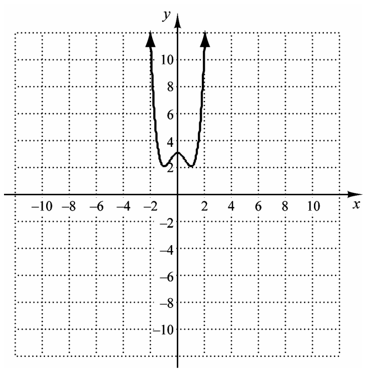
5. Relative maximum: 0 at $x = -1$; relative minimum: $-\frac{27}{4}$ at $x = \frac{1}{2}$; inflection point: $(-\frac{1}{4}, -\frac{27}{8})$

$f(x) = 4x^3 + 3x^2 - 6x - 5$



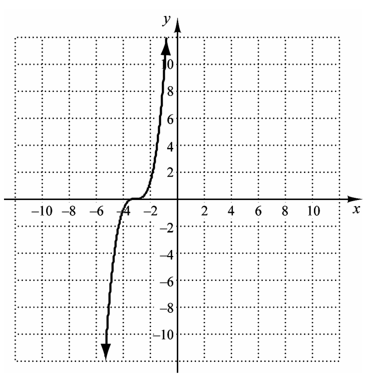
6. Relative maximum: 3 at $x = 0$; relative minima: 2 at $x = -1$ and $x = 1$; inflection points: $(-\sqrt{\frac{1}{3}}, \frac{22}{9})$ and $(\sqrt{\frac{1}{3}}, \frac{22}{9})$

$f(x) = x^4 - 2x^2 + 3$



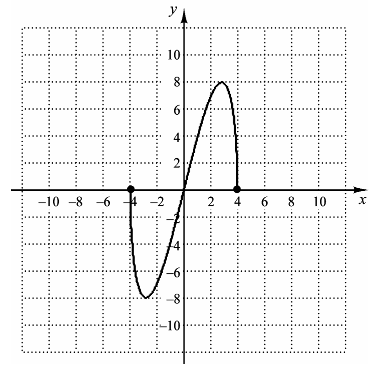
7. No relative extrema; inflection point: (–3, 0)

$f(x) = (x+3)^3$



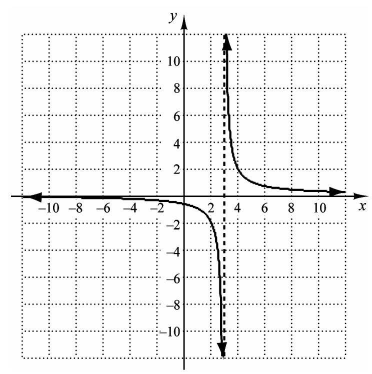
8. Relative maximum: 8 at $x = 2\sqrt{2}$; relative minimum: −8 at $x = -2\sqrt{2}$; inflection point (0, 0)

$f(x) = x\sqrt{16 - x^2}$



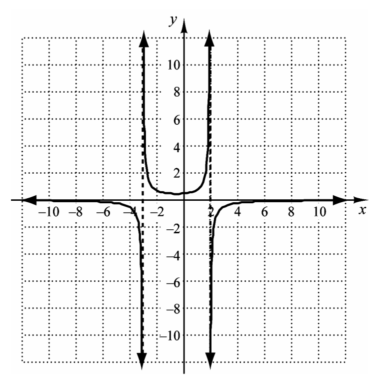
9. No relative extrema; asymptotes: $x = 3$ and $y = 0$

$$f(x) = \frac{2}{x-3}$$



10. Relative minimum: $\frac{12}{25}$ at $x = -\frac{1}{2}$; asymptotes: $x = -3$, $x = 2$, $y = 0$.

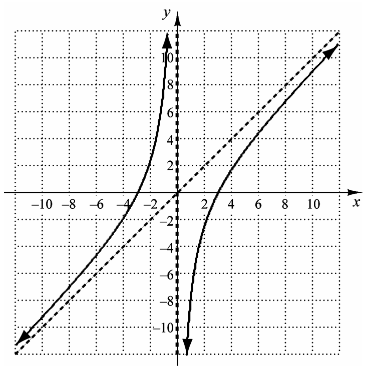
$$y = \frac{-3}{x^2 + x - 6}$$



CHAPTER 2, FORM C (continued)

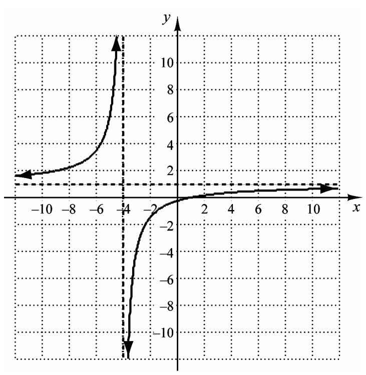
11. No relative extrema; asymptotes: $x = 0$ and $y = x$

$$f(x) = \frac{x^2 - 9}{x}$$



12. No relative extrema; asymptotes: $x = -4$ and $y = 1$

$$f(x) = \frac{x - 1}{x + 4}$$



13. Absolute maximum: 36 at $x = 6$; no absolute minimum

14. Absolute maximum: 9 at $x = -1$; absolute minimum: $-\frac{45}{16}$ at $x = -\frac{1}{4}$

15. Absolute maximum: 7.72 at $x = 1.8$; no absolute minimum

16. Absolute maximum: 9 at $x = -3$; absolute minimum: -3 at $x = 3$

17. There are no extrema.

18. No absolute maximum; absolute minimum: $\frac{23}{3}$ at $x = \frac{2}{3}$

19. No absolute maximum; absolute minimum: 75 at $x = -5$

20. -5 and 5

21. $x = \frac{9}{2}$; $y = -\frac{3}{2}$; $Q = 27$

22. Maximum profit: \$4,460; 150 units

23. 56 in. by 56 in. by 14 in.; 43,904 in^3

24. 20 times per year at lot size 180.

25. $\Delta y = -0.59$; $f'(x)\Delta x = -0.6$

26. 3.5

27. **(a)** $\dfrac{x\,dx}{\sqrt{x^2 + 7}}$;

(b) 0.0075

CHAPTER 2, FORM C (continued)

28. $\dfrac{2x^2}{y^2}$; $\dfrac{9}{8}$

29. ± 203.472 cm^3

30. The top of the ladder is moving at -0.17 ft/sec

31. Absolute maximum: $\frac{\sqrt[3]{4}}{3}$ at $x = 2\sqrt[3]{2}$; absolute minimum; 0 at $x = 0$

32. 225 units

33. Absolute minimum: -98.11 at $x = 4.87$; relative maximum: 10.62 at $x = 0.70$

34. **(a)** Linear: $9.999107143x + 23163.10714$

Quadratic: $-2.724709821x^2 + 663.9294643x + 1365.428571$

Cubic: $-0.0029743924x^3 - 1.653928571x^2 + 568.7489087x + 2507.595238$

Quartic: $-0.0001828495x^4 + 0.0847933633x^3 - 14.65191525x^2 + 1160.554347x + 100.2510823$

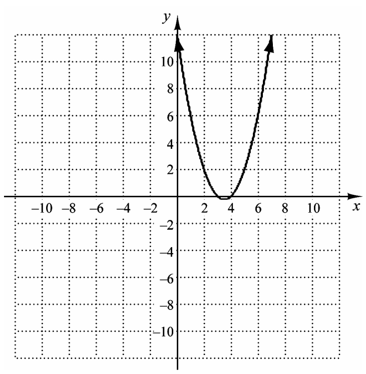
(b) [0, 240]

(c) The maximum value is 41,810 smartphones and the company should spend about \$122,000 on advertising.

CHAPTER 2, FORM D

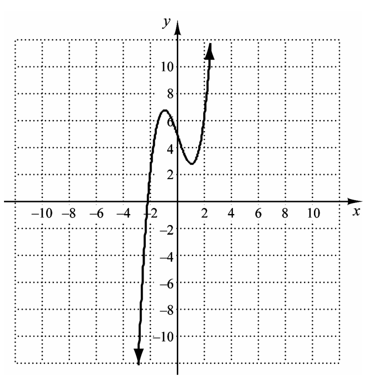
1. Relative minimum: $-\frac{1}{4}$ at $x=\frac{7}{2}$; decreasing on $(-\infty,\frac{7}{2})$; increasing on $(\frac{7}{2},\infty)$

$f(x)=x^2-7x+12$



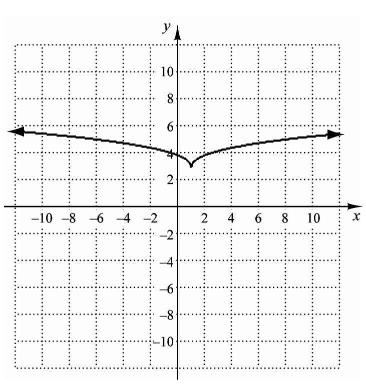
2. Relative maximum: 7 at $x=-1$; relative minimum: 3 at $x=1$; decreasing on $(-1, 1)$; increasing on $(-\infty,-1)$ and $(1,\infty)$

$f(x)=5-3x+x^3$



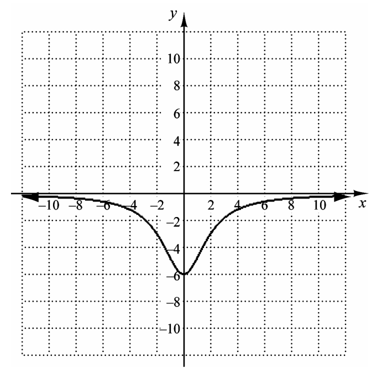
3. Relative minimum: 3 at $x=1$; decreasing on $(-\infty,1)$; increasing on $(1,\infty)$

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



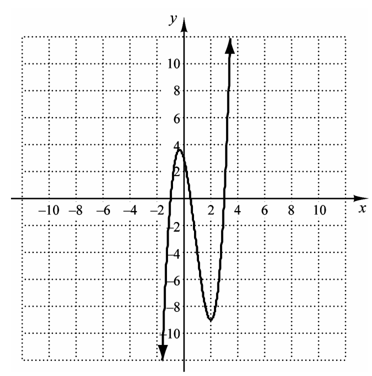
4. Relative minimum: -6 at $x=0$; decreasing on $(-\infty,0)$; increasing on $(0,\infty)$

$$f(x)=\frac{-24}{x^2+4}$$



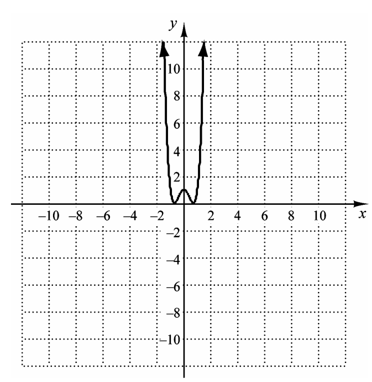
5. Relative maximum: $\frac{100}{27}$ at $x=-\frac{1}{3}$; relative minimum: -9 at $x=2$; inflection point: $(\frac{5}{6},-\frac{143}{54})$

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



6. Relative maximum: 1 at $x=0$; relative minima: 0 at $x=-\sqrt{\frac{1}{2}}$ and $\sqrt{\frac{1}{2}}$; inflection points: $(-\sqrt{\frac{1}{6}},\frac{4}{9})$ and $(\sqrt{\frac{1}{6}},\frac{4}{9})$

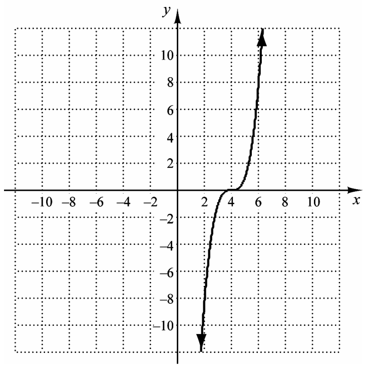
$f(x)=4x^4-4x^2+1$



CHAPTER 2, FORM D (continued)

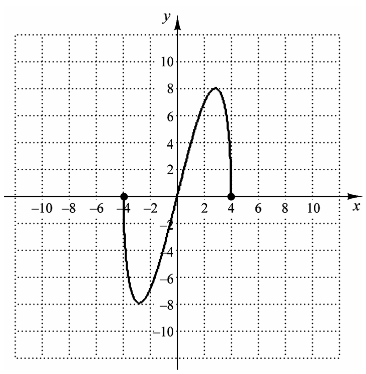
7. No relative extrema; inflection point: (4, 0)

$f(x) = (x-4)^3$



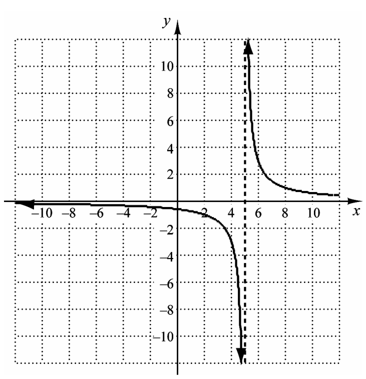
8. Relative maximum: 8 at $x = 2\sqrt{2}$; relative minimum: -8 at $x = -2\sqrt{2}$; inflection point: (0, 0)

$f(x) = x\sqrt{16 - x^2}$



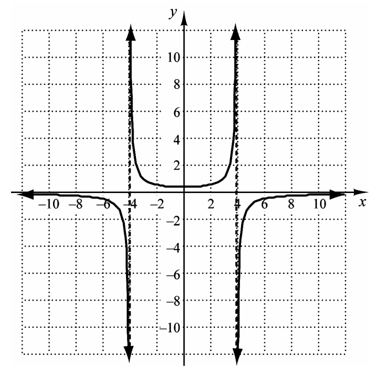
9. No relative extrema; asymptotes: $x = 5$ and $y = 0$

$f(x) = \dfrac{3}{x-5}$



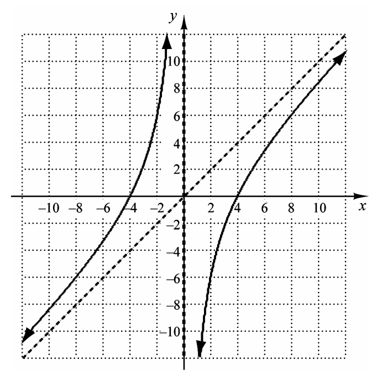
10. Relative minimum: $\frac{1}{2}$ at $x = 0$; asymptotes: $x = -4$, $x = 4$, $y = 0$

$f(x) = \dfrac{-8}{x^2 - 16}$



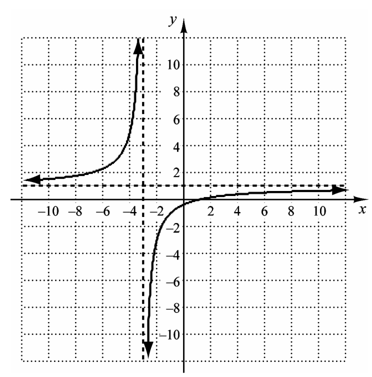
11. No relative extrema; asymptotes: $x = 0$ and $y = x$

$f(x) = \dfrac{x^2 - 16}{x}$



12. No relative extrema; asymptotes: $x = -3$ and $y = 1$

$f(x) = \dfrac{x-1}{x+3}$



CHAPTER 2, FORM D (continued)

13. Absolute maximum: $\frac{49}{4}$ at $x=\frac{7}{2}$; no absolute minimum

14. Absolute maximum: $\frac{79}{3}$ at $x=4$; absolute minimum: $-\frac{2}{3}$ at $x=1$

15. Absolute maximum: 20.64 at $x = 2.1$; no absolute minimum

16. Absolute maximum: 11 at $x = -2$; absolute minimum: 3 at $x = 2$

17. There are no extrema.

18. No absolute maximum; absolute minimum: $\frac{26}{3}$ at $x=\frac{2}{3}$

19. No absolute maximum; absolute minimum: 75 at $x = 5$

20. –4.5 and 4.5

21. $x=5$; $y=5$; $Q=100$

22. Maximum profit: $18,435; 430 units

23. 72 in. by 72 in. by 18 in.; 93,312 in^3

24. 14 times per year at lot size 35

25. $\Delta y=1.64$; $f'(x)\Delta x=1.6$

26. 8.6667

27. **(a)** $\frac{3x\,dx}{\sqrt{3x^2+2}}$;

(b) 0.0169705627

28. $\frac{x^2}{2y^2}; \frac{9}{8}$

29. $\pm 406.944 \text{ cm}^3$

30. The top of the ladder is moving at –0.6 ft/sec

31. Absolute maximum: $\frac{1}{3}$ at $x=-2$; absolute minimum: 0 at $x = 0$

32. 20,000 units

33. Absolute minimum: –55.31 at $x = 4.55$; relative maximum: 8.78 at $x = 0.62$

34. **(a)** Linear: $y = 1.99642857x - 14559.10714$;

Quadratic: $y=-1.172385714x^2 + 353.7121429x - 95.71428571$

Cubic: $y = -0.0004275556x^3 - 0.9799857143x^2 + 332.3343651x + 224.952381$

Quartic: $y = -0.000004281212x^4 + 0.0021411717x^3 - 1.455506061x^2 + 359.3977417x + 87.34199134$

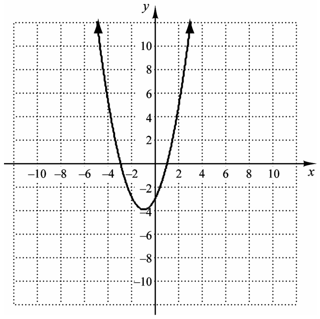
(b) [0, 300]

(c) The maximum value is 26,583 GPS locators and the company should spend about $151,000 on advertising.

CHAPTER 2, FORM E

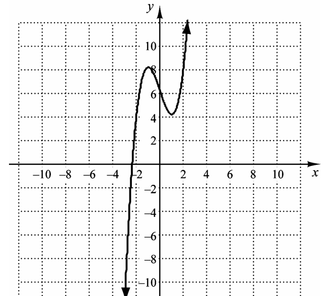
1. Relative minimum: –4 at $x = -1$; decreasing on $(-\infty,-1)$; increasing on $(-1,\infty)$

$f(x)=x^2+2x-3$



2. Relative maximum: 8 at $x = -1$; relative minimum: 4 at $x = 1$; decreasing on $(-1, 1)$; increasing on $(-\infty,-1)$ and $(1,\infty)$

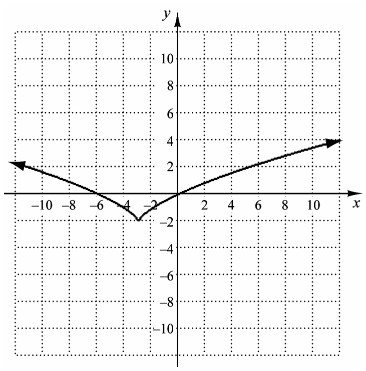
$f(x)=6-3x+x^3$



CHAPTER 2, FORM E (continued)

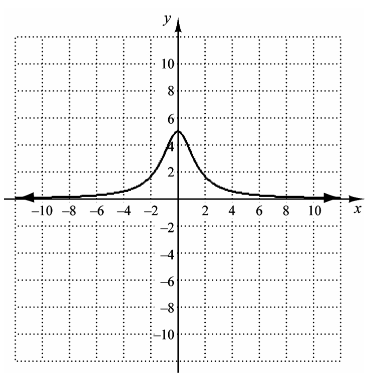
3. Relative minimum: -2 at $x=-3$; decreasing on $(-\infty,-3)$; increasing on $(-3,\infty)$

$y=(x+3)^{2/3}-2$



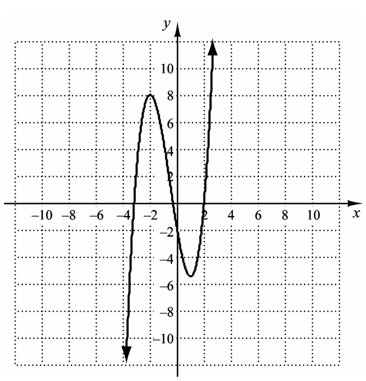
4. Relative maximum: 5 at $x=0$; decreasing on $(0,\infty)$; increasing on $(-\infty,0)$

$$f(x)=\frac{10}{x^2+2}$$



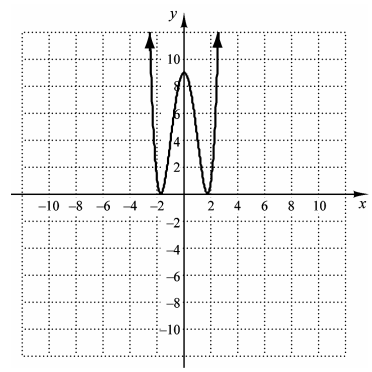
5. Relative maximum: 8 at $x=-2$; relative minimum: $-\frac{11}{2}$ at $x=1$; inflection point: $(-\frac{1}{2},\frac{5}{4})$

$f(x)=x^3+\frac{3}{2}x^2-6x-2$



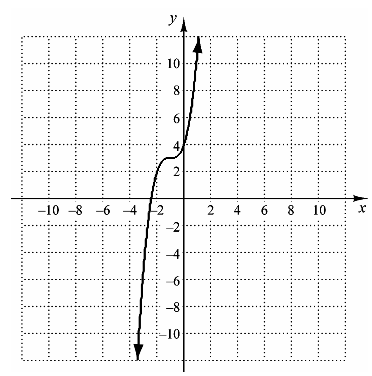
6. Relative maximum: 9 at $x=0$; relative minima: 0 at $x=-\sqrt{3}$ and $x=\sqrt{3}$; inflection points: $(-1,4)$ and $(1, 4)$

$f(x)=x^4-6x^2+9$



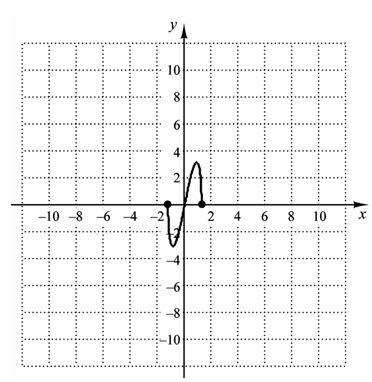
7. No relative extrema; inflection point; $(-1, 3)$

$f(x)=(x+1)^3+3$



8. Relative maximum: $\frac{25}{8}$ at $x=\sqrt{\frac{25}{32}}$; relative minimum: $-\frac{25}{8}$ at $x=-\sqrt{\frac{25}{32}}$; inflection point: $(0, 0)$

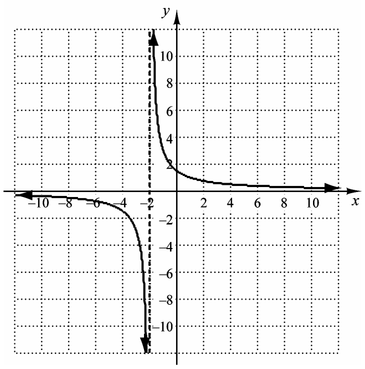
$f(x)=x\sqrt{25-16x^2}$



CHAPTER 2, FORM E (continued)

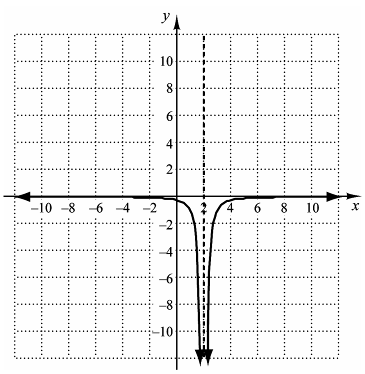
9. No relative extrema; asymptotes: $x = -2$ and $y = 0$

$$f(x) = \frac{3}{x+2}$$



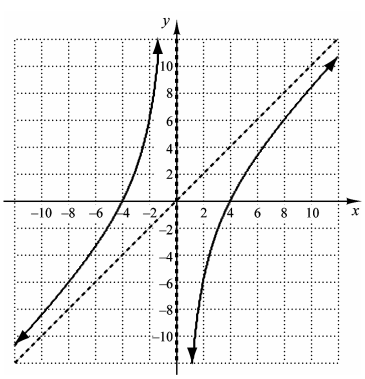
10. No relative extrema; asymptotes: $x = 2$, $y = 0$

$$f(x) = \frac{-1}{x^2 - 4x + 4}$$



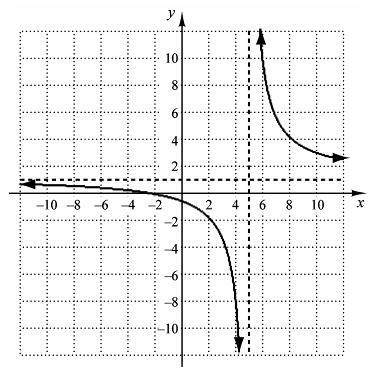
11. No relative extrema; asymptotes: $x = 0$ and $y = x$

$$f(x) = \frac{x^2 - 16}{x}$$



12. No relative extrema; asymptotes: $x = 5$ and $y = 1$

$$f(x) = \frac{x+4}{x-5}$$



13. Absolute maximum: 16 at $x = 4$; no absolute minimum

14. Absolute maximum: $\frac{100}{27}$ at $x = -\frac{1}{3}$; absolute minimum: -25 at $x = -2$

15. Absolute maximum: 17.56 at $x = 3.4$; no absolute minimum

16. Absolute maximum: 11 at $x = -2$; absolute minimum: 3 at $x = 2$

17. There are no extrema.

18. No absolute maximum; absolute minimum: $\frac{-67}{8}$ at $x = \frac{1}{4}$

19. No absolute maximum; absolute minimum: 12 at $x = 2$

20. -8 and 8

21. $x = 4$; $y = 2$; $Q = 24$

22. Maximum profit: $20,220; 225 units

23. $66\frac{2}{3}$ in. by $66\frac{2}{3}$ in. by $16\frac{2}{3}$ in.; $74{,}074\frac{2}{27}\text{ in}^3$

24. 3 times per year at lot size 17

25. $\Delta y = 0.81$; $f'(x)\Delta x = 0.8$

26. 7.75

27. **(a)** $\dfrac{x\,dx}{\sqrt{x^2+7}}$;

(b) 0.0060302269

CHAPTER 2, FORM E (continued)

28. $\dfrac{5x^2}{y^2}$; 1.25

29. ± 90.432 cm^2

30. The top of the ladder is moving at -0.4 ft/sec

31. Absolute maximum: 0 at $x = 0$; absolute minimum: $-\frac{2}{3}$ at $x = 2$

32. 32, 400 units

33. Absolute minimum: -27.42 at $x = 3.68$; relative maximum: 9.64 at $x = 0.77$

34. (a) Linear: $y = 0.2285714286x + 6932.714286$;

Quadratic: $y = -2.269028571x^2 + 340.5828571x - 158$

Cubic: $y = 0.0007128889x^3 - 2.1086571x^2 + 331.671746x - 91.16666667$

Quartic: $y = -0.000074637576x^4 - 0.0231041616x^3 - 0.0361030303x^2 + 272.694733x + 58.77489177$

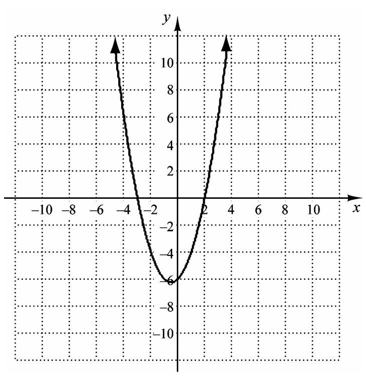
(b) [0, 150]

(c) The maximum value is 12,622 laptop computers and the company should spend about $75,000 on advertising.

CHAPTER 2, FORM F

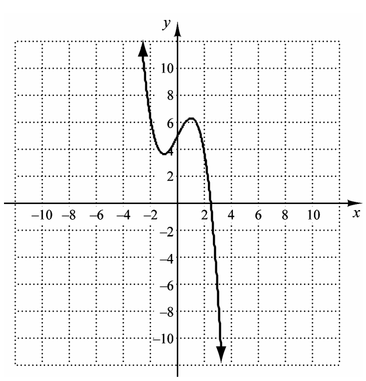
1. Relative minimum: $-\frac{25}{4}$ at $x = -\frac{1}{2}$; decreasing on $(-\infty, \frac{1}{2})$; increasing on $(-\frac{1}{2}, \infty)$

$f(x) = x^2 + x - 6$



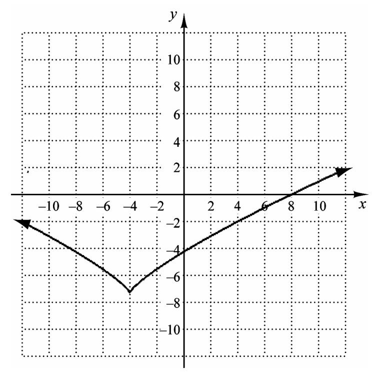
2. Relative maximum: $\frac{19}{3}$ at $x = 1$; relative minimum: $\frac{11}{3}$ at $x = -1$; decreasing on $(-\infty, -1)$ and $(1, \infty)$; increasing on $(-1, 1)$

$f(x) = 5 + 2x - \frac{2}{3}x^3$



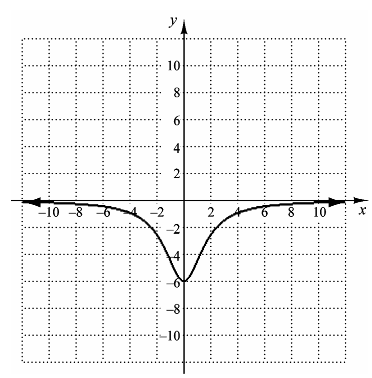
3. Relative minimum: -7 at $x = -4$; decreasing on $(-\infty, -4)$; increasing on $(-4, \infty)$

$y = (x + 4)^{4/5} - 7$



4. Relative minimum: -6 at $x = 0$; decreasing on $(-\infty, 0)$; increasing on $(0, \infty)$

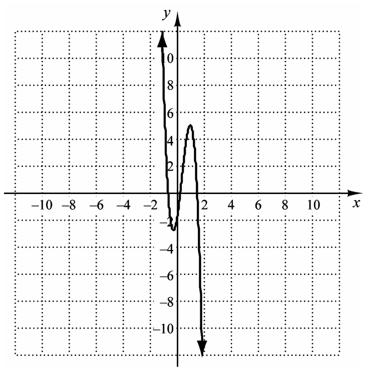
$f(x) = \dfrac{-18}{x^2 + 3}$



CHAPTER 2, FORM F (continued)

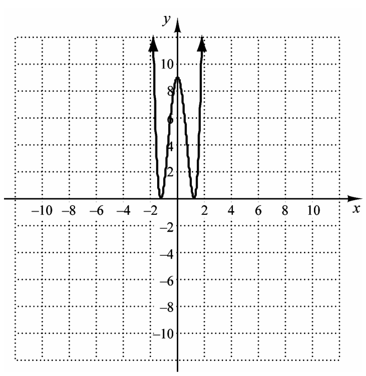
5. Relative maximum: 5 at $x = 1$; relative minimum: $-\frac{45}{16}$ at $x = -\frac{1}{4}$; inflection point: $(\frac{3}{8}, \frac{35}{32})$

$f(x) = -8x^3 + 9x^2 + 6x - 2$



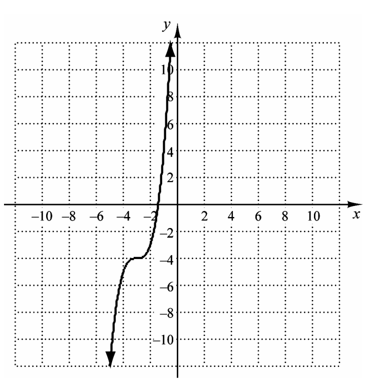
6. Relative maximum: 9 at $x = 0$; relative minima: 0 at $x = -\frac{\sqrt{6}}{2}$ and $\frac{\sqrt{6}}{2}$; inflections points: $(-\sqrt{\frac{1}{2}}, 4)$ and $(\sqrt{\frac{1}{2}}, 4)$

$f(x) = 4x^4 - 12x^2 + 9$



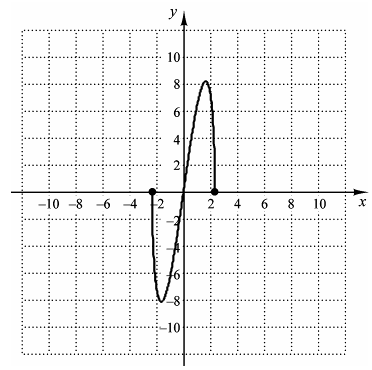
7. No relative extrema; inflection point: (–3, –4)

$f(x) = (x+3)^3 - 4$



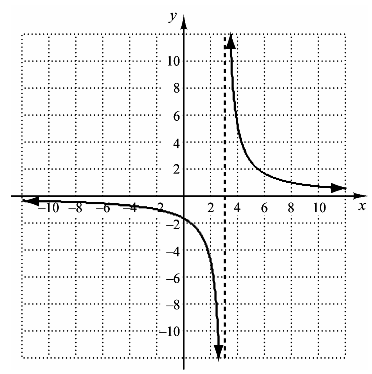
8. Relative maximum: $\frac{49}{6}$ at $x = \sqrt{\frac{49}{18}}$; relative minimum: $-\frac{49}{6}$ at $x = -\sqrt{\frac{49}{18}}$

$f(x) = x\sqrt{49 - 9x^2}$



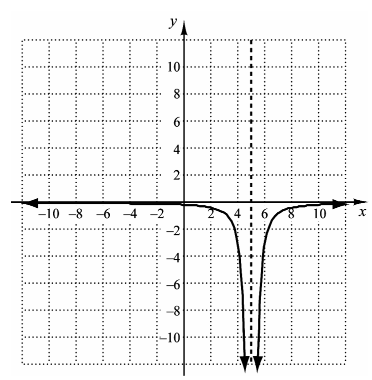
9. No relative extrema; asymptotes: $x = 3$ and y = 0

$$f(x) = \frac{5}{x-3}$$



10. No relative extrema; asymptotes: $x = 5$, $y = 0$

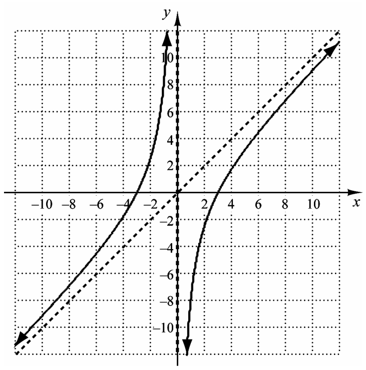
$$y = \frac{-3}{x^2 - 10x + 25}$$



CHAPTER 2, FORM F (continued)

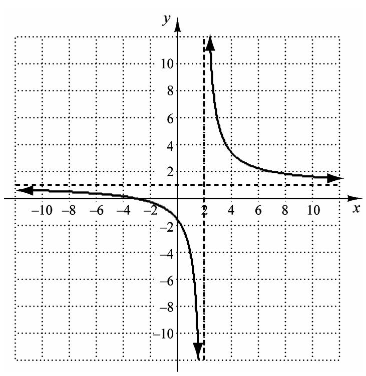
11. No relative extrema; asymptotes: $x = 0$ and $y = x$

$f(x) = \dfrac{x^2 - 9}{x}$



12. No relative extrema; asymptotes: $x = 2$ and $y = 1$

$f(x) = \dfrac{x+3}{x-2}$



13. Absolute maximum: $\frac{81}{4}$ at $x = \frac{9}{2}$; no absolute minimum

14. Absolute maximum: 83 at $x = -2$; absolute minimum: $\frac{-93}{16}$ at $x = -\frac{1}{4}$

15. Absolute maximum: 13.96 at $x = -3.6$; no absolute minimum

16. Absolute maximum: 7 at $x = -2$; absolute minimum: 3 at $x = 2$

17. There area no extrema.

18. No absolute maximum; absolute minimum: $\frac{231}{16}$ at $x = \frac{5}{8}$

19. No absolute maximum; absolute minimum: 192 at $x = 8$

20. −4 and 4

21. $x = 2$; $y = 2$; $Q = 8$

22. Maximum profit: $6690; 150 units

23. 54 in. by 54 in. by 13.5 in.; 39,366 in^3

24. 4 times per year at lot size 300

25. $\Delta y = -0.79$; $f'(x)\Delta x = -0.8$

26. 4.5

27. **(a)** $\dfrac{2x\,dx}{\sqrt{2x^2 - 1}}$

(b) 0.0142857143

28. $\dfrac{-3x^2}{4y}$; $-\dfrac{1}{4}$

29. $\pm\,984.704\ \text{cm}^3$

30. The top of the ladder is moving at $-0.05\overline{3}$ ft/sec

31. No absolute maximum; absolute minimum: 0 at $x = 0$

32. 8,100 units

33. Absolute minimum: 0 at $x = 0$; relative minimum: 5.92 at $x = 2.70$; relative maximum: 16 at $x = 1$

34. **(a)** Linear: $y = 0.2142857143x + 5199.714286$;

Quadratic: $y = -2.658988095x^2 + 319.2928571x - 118.2619048$

Cubic: $y = -0.0010451389x^3 - 2.470863095x^2 + 310.931746x - 68.0952381$

Quartic: $y = 0.0001366714x^4 - 0.0338462753x^3 - 0.0420170454x^2 + 255.6384019x + 44.36580087$

(b) [0, 120]

(c) The maximum value is 9,467 digital cameras and the company should spend about $60,000 on advertising.