Chapter 1
Solved Problems

Problem 1

1.*a*

```
>> (28.5*3^3-sqrt(1500))/(11^2+37.3)
ans =
    4.6164
```

1.*b*

```
>> (7/3)^2*4^3*18-6^7/(9^3-652)
ans =
  2.6365e+003
```

Problem 2

2.*a*

```
>> p2a=23*(-8+sqrt(607)/3)+(40/8+4.7^2)^2
p2a =
  738.7546
```

2.*b*

```
>> p2b=509^(1/3)-4.5^2+log(200)/1.5+75^(1/2)
p2b =
   -0.0732
```

Problem 3

3.*a*

```
>> (24+4.5^3)/(exp(4.4)-log10(12560))
ans =
    1.4883
```

3.*b*

```
>> 2/0.036*(sqrt(250)-10.5)^2/exp(-0.2)
ans =
  1.9143e+003
```

Problem 4

4.*a*

```
>> p4a=cos(5*pi/6)*sin(7*pi/8)^2+tan(pi/6*log(8))/
(sqrt(7)+2)
p4a =
    0.2846
```

4.*b*

```
>> p4b=cos(3*pi/5)^2+tan(pi*log(6)/5)/8/(7/2)
p4b =
    0.1704
```

Problem 5

```
>> x=9.75;
```

5.*a*

```
>> 4*x^3-14*x^2-6.32*x+7.3
ans =
  2.3222e+003
```

5.*b*

```
>> exp(sqrt(3))/(0.02*3.1^2)^(1/3)
ans =
    9.7942
```

5.*c*

```
>> log10((x^2-x^3)^2)
ans =
    5.8400
```

Problem 6

```
>> x=5.3; z=7.8;
```

6.*a*

```
>> x*z/(x/z)^2+14*x^2-.8*z^2
ans =
  434.1261
```

6.*b*

```
>> x^2*z-z^2*x+(x/z)^2-(z/x)^(1/2)
ans =
  -104.1014
```

Problem 7

```
>> a=-18.2; b=6.42; c=a/b; d=0.5*(c*b+2*a);
```

7.*a*

```
>>d-(a+b)/c+(a+d)^2/sqrt(abs(a*b*c))
ans =
   82.2946
```

7.*b*

```
>> log((c-d)*(b-a))+(a+b+c+d)/(a-b-c-d)
ans =
   -1.1995
```

Problem 8

Script file:

```
r = 15;
As = 4*pi*r^2; %surface area of sphere
Vs = 4/3*pi*r^3; %volume of sphere
% the surface area of a cube is 6a^2
parta = sqrt(As/6)
partb = Vs^(1/3)
```

Command Window:

```
parta =
   21.7080
partb =
   24.1799
```

Problem 9

9*a*

```
r=sqrt(200/4/pi);
>> V=4/3*pi*r^3
V =
  265.9615
```

9*b*

```
>> V=4/3*pi*sqrt(200/4/pi)^3
V =
  265.9615
```

Problem 10

```
>> x = 7/20*pi;
```

10.*a*

```
>> sin(3*x)
ans =
   -0.1564
>> 3*sin(x)-4*sin(x)^3
ans =
   -0.1564
```

10.*b*

```
>> sin(x/2)
ans =
    0.5225
>> sqrt((1-cos(x))/2)
ans =
    0.5225
```

Problem 11

```
>> x=27;
```

11.*a*

```
>> tand(3*x)
ans =
    6.3138

>> (3*tand(x)-tand(x)^3)/(1-3*tand(x)^2)
ans =
    6.3138
```

11.*b*

```
>> tand(x/2)
ans =
    0.2401
>> sind(x)/(1+cosd(x))
ans =
    0.2401
```

Problem 12

```
>> alpha=5*pi/9; beta=pi/7;
>> sin(alpha)*sin(beta)
ans =
    0.4273
>> 1/2*(cos(alpha-beta)-cos(alpha+beta))
ans =
    0.4273
```

Problem 13

```
>> b=3*pi/4; a=pi/3;
>> 1/2*b-1/4*sin(2*b)-(1/2*a-1/4*sin(2*a))
ans =
    1.1210
```

Problem 14

```
>> a=21; b=45; c=60;
```

14.*a*

```
>> gama=acosd((a^2+b^2-c^2)/(2*a*b))
gama =
  126.8699
```

Answer: $\gamma = 126.8699°$

14.*b*

```
>> alpha=asind(sind(gama)*a/c)
alpha =
   16.2602
>> beta=asind(sind(gama)*b/c)
beta =
   36.8699
```

Answer: $\alpha = 16.2602°$; $\beta = 36.8699°$

14.*c*

```
>> alpha+beta+gama
ans =
   180
```

Problem 15

```
>> a=15; b=35;
```

15.*a* and b

```
>> c=sqrt(a^2+b^2)
c =
   38.0789
>> alpha=acosd(b/c)
alpha =
   23.1986
```

Answer: $\alpha = 23.1986°$

Problem 16

```
>> A=2;B=-7;C=-10;x0=3;y0=-4;
>> d=abs(A*x0+B*y0+C)/sqrt(A^2+B^2)
d =
    3.2967
```

Problem 17

```
>> ceil(634/18)
ans =
    36
```

Answer: 36 containers

Problem 18

```
>> CD_price=13.95; Book_price=44.95;
>> format bank
```

18.*a*

```
>> parta = 3*CD_price+5*Book_price
parta =
        266.60
```

18.*b*

```
>> partb = (3*CD_price+5*Book_price)*1.0575
partb =
        281.93
```

18.*c*

```
>> partc = round((3*CD_price+5*Book_price)*1.0575)
partc =
        282.00
```

Problem 19

```
>> factorial(12)/factorial(5)/factorial(12-5)
ans =
   792
```

Answer: There are 792 different 5-player teams.

Problem 20

20.*a*

```
>> parta=log(281)/log(5)
parta =
    3.5033
```

20.*b*

```
>> partb=log10(1054)/log10(7)
partb =
    3.5769
```

Problem 21

Script file:

```
% f(t)/f(0) = 1/2 at the half life of 3.261 days
% so 1/2 = exp(k*3.261)
k = log(1/2)/3.261
f7 = 100*exp(k*7);
f7_round = round(10*f7)/10
```

```
k =
   -0.2126
f7_round =
   22.6000
```

Answer: The rate constant is k = -.2126 $days^{-1}$. There are 22.6 milligrams (rounded to the nearest tenth) remaining after 7 days.

Problem 22

22.*a*

```
>> lcm(4,14)
ans =
    28
```

22.*b*

```
>> lcm(8,42)
ans =
   168
```

Problem 23

```
>> E0=10^4.4;
>> E_71=E0*10^(3/2*7.1);
>> E_69=E0*10^(3/2*6.9);
>> ratio = E_71/E_69
ratio =
    1.9953
```

Or, more elegantly,

```
>> 10^(3/2*(7.1-6.9))
ans =
    1.9953
```

Problem 24

```
>> r=0.085;
>> B=20000*(1+r)^18
B =
  8.6849e+004

>> time=log(B/5000)/r
time =
   33.5851

>> .5851*12
ans =
    7.0212

>> .0212*30
ans =
    0.6360
```

Answer: 33 years, 7 months, 1 day

Problem 25

```
>> A=16.0137; B=3096.52; C=-53.67;
>> p_315=exp(A-B/(C+315))
p_315 =
   64.3682

>> p_405=exp(A-B/(C+405))
p_405 =
  1.3394e+003
```

Answer: p = 64.4 mm Hg at 315 K; p = 1340 mm Hg at 405 K

Problem 26

```
>> p0=20e-6;
>> p90=p0*10^(90/20)
p90 =
    0.6325
>> p65=p0*10^(65/20)
p65 =
    0.0356
>> p90/p65
ans =
   17.7828
```

Answer: The sound pressure at 90 dB is 0.6325 Pa. The sound pressure of the truck is 17.8 times more than that of normal conversation.