1) A large corporation has a medical and dental insurance that costs a company $180 per month for each employee. The total monthly cost of this plan is $4,518,000. How many employees participate in the insurance plan?

2) A salesperson used 94.5 gallons in traveling 2457 miles by car last spring. Find the average number of miles traveled per gallon of gas.

3) Mary purchased a utility stock on January 31 for $41 5/8 per share. It gained $1 ¼ per share in February, lost $7/8 per share in March and gained $1 ½ per share in April.

   A) What is the value of this stock, per share, at the end of April?

   B) At the end of April, find the percentage increase in the value of Mary's stock as compared to its January 31st value.

4) Your purchases: 6.75 pounds of Food A at $2/pound and 4.00 pounds of Food B at $3.75/pound, you give the cashier two TWENTY DOLLAR bills. What is your change?

5) You have $5 ¾. Orange juice costs $2 1/8 per half-gallon. Express, as a fraction, the number of half-gallons you can purchase if you spend all the money you have?

6) Twelve percent of what number equals 60?
7) Simplify each radical:

a) \(3 \sqrt{-27}\)  
b) \(-\sqrt{64}\)  
c) \(\sqrt{100 + 400}\)  
d) \((\frac{1}{8}) \cdot \sqrt{16}\)

8) Add or subtract as indicated:

a) \(6 + (-7)\)  
b) \(-3 - 7\)  
c) \(-9 - (-17)\)

9) Multiply:

a) \(5 (-3)\)  
b) \(-3(-7)(-2)\)  
c) \(9 (-2)^2\)

10) Simplify:

a) \(\frac{-42}{(-10 + 17)}\)  
b) \(\frac{-28}{(-4)}\)  
c) \(18.073 - 2.91\)

11) Simplify:

a) \((-3)^3\)  
b) \(2.04 \times 1.7\)  
c) \(3 (-2)^3\)  
d) \(\frac{5}{8} - 2 \frac{1}{4} + 3 \frac{1}{2}\)  
e) \(8 \frac{2}{3} \times 2 \frac{1}{2}\)
12) Solve for the given variable:

a) \( y = mx + b \)
   i. Solve for \( x \)
   ii. Solve for \( b \)

b) \( D = x - px \)
   i. Solve for \( p \)
   ii. Solve for \( x \)

c) Solve for \( y \):
   \[ y + 8 = -(y - 4) \]

13) In a – c, simplify. Express final answer with positive exponents only:

a) \((x^3 \ y^2 \ x^2)^2\)

b) \(\frac{2x^2 \ y^4}{6x^3 \ y^4}\)

c) \(\sqrt[3]{8^4 - 64 - \frac{2}{3}}\)

d) Combine like terms:
   e) \(-9x^2 + 18x = ?\)

f) Multiply:
   \(-2 \ [4 (2x - 7B) - (9 - B)]\)

-3x

\(4x^3 - 7\) \(8x - 5\)

g) Subtract:
   h) Divide:
   i):

\[
\begin{align*}
9A - 3B - 8 - 7A & \quad 8x - 72 + x - 9 \quad f(x) = 7x^3 - 9x \\
4R & \quad 10R \\
6x + 24 & \quad 2x^2 - 32 \quad \text{Find } f(-2)
\end{align*}
\]

14) Use the quadratic formula to solve for \( x \):

a) \(x^2 + 2x - 5 = 0\)

b) \(2x^2 + 2x - 3 = 0\)

15) Solve for variables:

a) Solve for \( x \): \(x^2 - 5x = -4\)

b) Solve for \( x \): \(9x^2 - 4 = 0\)

c) Solve for \( x \) and \( y \): \(2x + 3y = 8\)

\[
7x - 6y = 39
\]

16) Find the slope and \( y \)-intercept in each exercise:

a) \(2x - 5y = 15\)

b) \(2y = 3x - 4\)
17) Solve each trigonometric equation. In questions a through c, express the solution(s) in degrees, 0 <= t <= 360°. In questions d through g, express the solution(s) in radians, 0 <= t <= 2\pi.

a) \( \sin t = \frac{1}{2} \)  
   b) \( \tan t = -1 \)  
   c) \( 2 \cos t + 1 = 0 \)  

   d) \( 2 \sin t - \sqrt{3} = 0 \)  
   e) \( 3 \tan t + \sqrt{3} = 0 \)  
   f) \( 4 \sin^2 t - 3 = 0 \)  

   g) \( \sin^2 t - 2 \sin t = -1 \)

18) In the accompanying triangle, determine: \( \sin A \), \( \cos A \) and \( \tan A \).

Answer Key
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1) 25,100 employees  
2) 26 MPG  
3) a. $43.50 b. 4.5%  
4) $11.50  
5) 46 half-gallons  
6) 500  

7)  
a. -3  
b. -8  
c. $10 \sqrt{5}$  
d. 1/2  

8)  
a. -1  
b. -10  
c. 8  

9)  
a. -15  
b. -42  
c. 36  

10)  
a. -6  
b. 7  
c. 15.163  

11)  
a. -27  
b. 3.468  
c. -24  
d. 5 7/8  
e. 65/3  

12)  
a. i. \( x = (y - b) / m \)  
b. i. \( p = (x - D) / x \)  
c. \( y = -4 \)  
ii. \( b = y - mx \)  
ii. \( x = D / (1 - p) \)
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ANSWER KEY (cont.)

13)

a. \(x^2 / y^4\)  
b. \(1 / 3xy^8\)  
c. \(15 15/16\)
d. \(-16x + 54B + 18\)  
e. \(3x - 6\)  
f. \(32x^4 - 20x^3 - 56x + 35\)
g. \((59A - 15B - 16) / 20R\)  
h. \(8 (x-4) /3\)  
i. \(-38\)

14)

a. \(x = -1 + \sqrt{6}, 1- \sqrt{6}\)  
b. \(x = (-1 + \sqrt{7}) / 2, (-1 - \sqrt{7}) / 2\)

15)

a. \(x = 1, 4\)  
b. \(x = 2/3, -2/3\)  
c. \((x,y) = (5, -2/3)\)

16)

a. slope = \(2/5\)  
y-intercept = \(-3\)  
b. slope = \(3/2\)  
y-intercept = \(-2\)

17)

a. \(30^\circ, 150^\circ\)  
b. \(135^\circ, 315^\circ\)  
c. \(120^\circ, 240^\circ\)
d. \(\pi /3, 2\pi /3\)  
e. \(5\pi /6, 11\pi /6\)  
f. \(\pi /3, 2\pi /3, 4\pi /3, 5\pi /3\)
g. \(\pi /2\)

18)

\(\sin A = 4/7\)  
\(\cos A = \frac{\sqrt{33}}{7}\)  
\(\tan A = \frac{4\sqrt{33}}{33}\)