

Quiz 5 on Using Formulas to Solve Problems

Instructions: Solve the following problems. Be sure to state the unknown, what is given with a list or a diagram, and the required formula.

- 1) A plane traveling at 550 miles per hour crossed the Atlantic Ocean in $8\frac{1}{2}$ hours. How far did it travel?

Unknown: D

Given:

$$r = 550 \text{ MPH} \quad D = rt$$

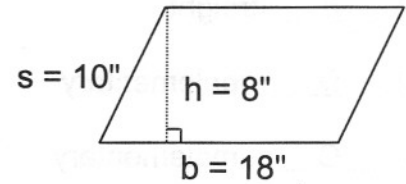
$$t = 8\frac{1}{2} \text{ hours} = \frac{550 \text{ miles}}{\text{hour}} (8.5 \text{ hours})$$

$$= 4,675 \text{ miles}$$

Note: Decimals are often easier to use than fractions.

- 2) Find the perimeter and area of a parallelogram with bases of 18", a height of 8", and sides of 10".

Unknown:



P and A

$$P = b + s + b + s$$

$$= 18 + 10 + 18 + 10$$

$$= 56 \text{ inches}$$

$$A = bh$$

$$= (18)(8)$$

$$= 144 \text{ square inches}$$

Note: " is a symbol for inches and ' is a symbol for feet.

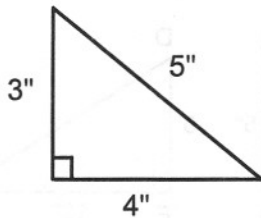
- 3) What is the perimeter of a triangle with sides of 3, 4, and 5 inches? Extra credit! What is the special name of this type of triangle?

Unknown: P

$$P = s + s + s$$

$$= 3 + 4 + 5$$

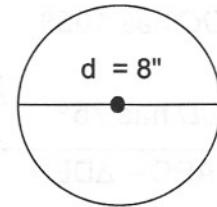
$$= 12 \text{ inches}$$



Extra credit: It is a right triangle as $3^2 + 4^2 = 5^2$.

- 4) Find the circumference and area of a circle with a diameter of 8 inches.

Unknown:



C and A

$$r = \frac{d}{2} = \frac{8}{2} = 4 \text{ inches}$$

$$C = \pi d$$

$$= (3.14)(8)$$

$$= 25.12 \text{ inches}$$

$$A = \pi r^2$$

$$= (3.14)(4)^2$$

$$= (3.14)(16)$$

$$= 50.24 \text{ square inches}$$

- 5) Find the height of a triangle with a base of 12 inches and an area of 36 sq. inches.

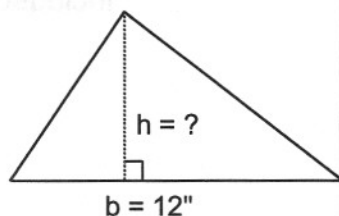
Unknown: h

$$A = \frac{bh}{2}$$

$$36 = \frac{(12)(h)}{2}$$

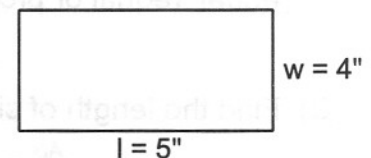
$$36 = 6h$$

$$h = 6 \text{ inches}$$



- 6) Find the perimeter and area of a rectangular figure 5 inches long and 4 inches wide.

Unknown:



P and A

$$P = l + w + l + w$$

$$= 5 + 4 + 5 + 4$$

$$= 18 \text{ inches}$$

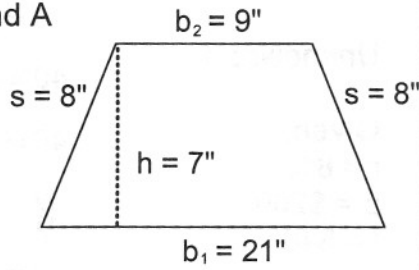
$$A = lw$$

$$= (5)(4)$$

$$= 20 \text{ square inches}$$

- 7) Find the perimeter and area of a trapezoid with bases of 21 and 9 inches, sides of 8 inches, and a height of 7 inches.

Unknown: P and A

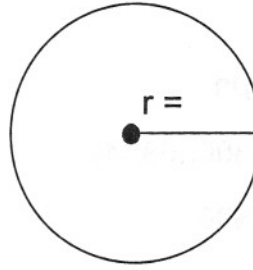


$$\begin{aligned}
 P &= b_1 + s + b_2 + s \\
 &= 21 + 8 + 9 + 8 \\
 &= 46 \text{ inches}
 \end{aligned}$$

$$\begin{aligned}
 A &= \frac{1}{2}(b_1 + b_2)h \\
 &= \frac{1}{2}(21 + 9)7 \\
 &= 105 \text{ sq. inches}
 \end{aligned}$$

- 8) What is the radius of a circle having an area of 113.04 square inches?

Unknown: r



$$\begin{aligned}
 A &= \pi r^2 \\
 113.04 &= (3.14)(r^2)
 \end{aligned}$$

$$\frac{113.04}{3.14} = \frac{3.14r^2}{3.14}$$

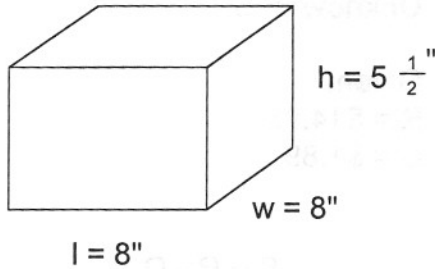
$$36 = r^2$$

$$\sqrt{36} = \sqrt{r^2}$$

$$r = 6 \text{ inches}$$

- 9) A rectangular box has dimensions of 8" x 8" x 5 1/2". Find the volume of this box.

Unknown: V

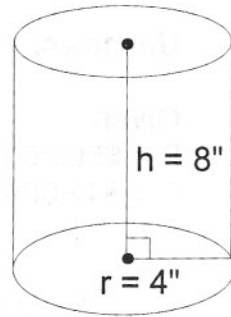


$$\begin{aligned}
 V &= lwh \\
 &= (8)(8)(5\frac{1}{2}) \\
 &= 352 \text{ cubic inches}
 \end{aligned}$$

- 10) Find the volume of a cylinder with a 4-inch radius and a height of 8 inches.

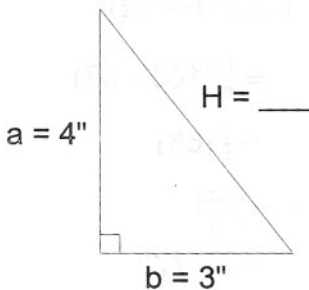
Unknown: V

$$\begin{aligned}
 V &= \pi r^2 h \\
 &= 3.14(4)^2(8) \\
 &= 401.92 \text{ cubic inches}
 \end{aligned}$$



- 11) Find the hypotenuse of a right triangle with a base of 3 inches and a height of 4 inches.

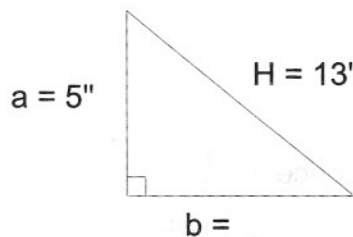
Unknown: H



$$\begin{aligned}
 H^2 &= a^2 + b^2 \\
 &= 4^2 + 3^2 \\
 &= 16 + 9 \\
 H^2 &= 25 \\
 \sqrt{H^2} &= \sqrt{25} \\
 H &= 5 \text{ inches}
 \end{aligned}$$

- 12) Find the base of a right triangle with a height of 5" and a hypotenuse of 13".

Unknown: b



$$\begin{aligned}
 H^2 &= a^2 + b^2 \\
 13^2 &= 5^2 + b^2 \\
 169 &= 25 + b^2 \\
 144 &= b^2 \\
 \sqrt{144} &= \sqrt{b^2} \\
 b &= 12 \text{ inches}
 \end{aligned}$$

How much interest will \$300 earn over four years with a simple interest rate of 8 percent per year?

Unknown: I

Given:

$$p = \$300$$

$$r = 8\%$$

$$t = 4 \text{ years}$$

$$I = prt$$

$$= 300(.08)(4)$$

$$= \$96$$

14) How long would it take a \$200 bank account earning 8% simple interest to earn \$40 interest?

Unknown: t

Given:

$$r = 8\%$$

$$p = \$200$$

$$I = \$40$$

$$I = prt$$

$$40 = (200)(.08)(t)$$

$$40 = 16t$$

$$\frac{40}{16} = \frac{16t}{16}$$

$$t = 2.5 \text{ years}$$

15) Find the profit of a business with revenue of \$56,000,000 and costs of \$42,000,000.

Unknown: P

Given:

$$R = \$56,000,000$$

$$C = \$42,000,000$$

$$P = R - C$$

$$= 56,000,000 - 42,000,000$$

$$= \$14,000,000$$

16) Betty received a \$1.89 discount on a CD which normally sells for \$14.95. What was the sale price?

Unknown: S

Given:

$$R = \$14.95$$

$$D = \$1.89$$

$$S = R - D$$

$$= 14.95 - 1.89$$

$$= \$13.06$$

17) What is the unit price of 4 Cokes selling for \$1.84?

Unknown: unit price

Given:

$$n = 4$$

$$T = \$1.84$$

$$\text{Unit price} = \frac{T}{n}$$

$$= \frac{\$1.84}{4}$$

$$= \$.46$$

18) It seems very hot when the Fahrenheit temperature goes over 100 degrees. Find the equivalent Celsius temperature.

Unknown: C

Given:

$$F = 100 \text{ degrees}$$

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

$$= \frac{5}{9}(100 - 32)$$

$$= \frac{5}{9}(68)$$

$$= \frac{340}{9}$$

$$= 37.7\bar{7}^{\circ}$$