Math 1

Name _____

Lesson 1-2: Literal Equations

Date _____

Learning Goals:

- *I can solve equations for a specified variable.*

1. Mr. Nidy traveled to The Ohio State University in Columbus for a college reunion party. He determined his average speed was 63 mph and it took him three hours to get there. How many miles did he have to travel? (*distance = rate • time*)

$$d = 63 \cdot 3$$
$$= \boxed{189 \text{ miles}}$$

2. Using the formula $d = rt$, solve for r.

$$r = \frac{d}{t}$$

3. Mr. Nidy's wife had to stay late at work and decided to meet him there. If they both left from their house, what was his wife's average speed if she took 3.5 hours to get there?

$$r = \frac{189}{3.5} = \boxed{54 \text{ mph}}$$

4. Solve $d = rt$ for t.

$$t = \frac{d}{r}$$

5. On the way home from the reunion, Mr. Nidy drove an average of 68 mph. How long did it take him to drive home?

$$t = \frac{189}{68} \approx \boxed{2.779 \text{ hours}}$$

Solve the following equations for the specified variable.

6. $V \left(d = \dfrac{m}{V} \right)$ Solve for V.

$$dV = m$$

$$\boxed{V = \dfrac{m}{d}}$$

7. $v_f = v_0 + at$ Solve for a.

$$V_f - V_0 = at$$

$$\boxed{a = \dfrac{V_f - V_0}{t}}$$

8. $V = IR$ Solve for R.

$$R = \dfrac{V}{I}$$

9. $R \left(F = \dfrac{mv^2}{R} \right)$ Solve for R.

$$RF = mv^2$$

$$\boxed{R = \dfrac{mv^2}{F}}$$

10. $F = \dfrac{mv^2}{R}$ Solve for v.

$$FR = mv^2 \qquad \rightarrow V = \pm\sqrt{\dfrac{FR}{m}}$$

$$\dfrac{FR}{m} = v^2$$

11. $T_2 \left(\dfrac{P_1 V_1}{T_1} = \dfrac{P_2 V_2}{T_2} \right)$ Solve for T_2.

$$\dfrac{T_2 \cdot P_1 V_1}{T_1} = P_2 V_2 \cdot \dfrac{T_1}{P_1 V_1} \qquad \rightarrow T_2 = \dfrac{P_2 V_2 T_1}{P_1 V_1}$$

12. $2x - 7y = 10$ Solve for y.

$$-7y = 10 - 2x$$

$$\boxed{y = \dfrac{-10}{7} + \dfrac{2x}{7} \qquad or \qquad y = -\dfrac{10 - 2x}{7}}$$

13. $Ax + By = C$ Solve for y.

$$By = C - Ax$$

$$\boxed{y = \frac{C - Ax}{B}}$$

14. $y - 6 = \frac{2}{3}(x + 5)$ Solve for y.

$$y - 6 = \frac{2}{3}x + \frac{10}{3}$$

$$y = \frac{2}{3}x + \frac{28}{3} \to 9.\overline{3}$$

15. $\frac{3}{2}\left(y - 6 = \frac{2}{3}(x + 5)\right)$ Solve for x.

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

$$\boxed{\frac{3}{2}y - 14 = x}$$

16. $A = \pi r^2$ Solve for r.

$$\frac{A}{\pi} = r^2$$

$$r = \pm\sqrt{\frac{A}{\pi}} \to \text{discuss if } - \text{of } \pm \text{ does not make sense.}$$

Can r be negative?

17. If the area of circle is 121π, what is the radius?

$$r = \sqrt{\frac{121\pi}{\pi}} = \sqrt{121} = \boxed{11 \text{ units}}$$

18. The formula to determine the temperature in Fahrenheit when the temperature in Celsius is known is $F = \frac{9}{5}C + 32$. What equation would convert the temperature from Fahrenheit to Celsius? If the temperature is $86°\,F$, what is the temperature in Celsius?

$C = \ldots$

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

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

$$C = \frac{5}{9}(86 - 32)$$

$$C = \frac{5}{9}(54)$$

$$\boxed{C = 30° \text{ Celsius}}$$