

Algebra RH

Essential Question: How do we solve equations involving formulas?

Do Now:

Write as many formulas as you can (*Hint: Think of formulas discussed during math and science classes*).

1. $D = \frac{M}{V}$

2. $S = \frac{D}{T}$

3. $A = bh$

4. $A = \frac{h(b_1 + b_2)}{2}$

5. $A = lw$

6. $a^2 + b^2 = c^2$

Formula: a mathematical statement or rule

Dependent Variable: A variable in a relationship (formula). Its value *depends* upon or is determined by the other variable(s) (independent variable). **OUTPUT**

Independent Variable: A variable in a relationship (formula). Its value determines the value of the other variable (dependent variable). **INPUT**

Examples:

a. $A = S^2$
↑ dependent variable
↙ independent variable
Using a Formula

b. $P = 2l + 2w$
↑ dependent variable
↙ ↘ independent variables

1. Using the formula $F = \frac{9}{5}C + 32$, find F° if $C = 25^\circ$

$$F = \frac{9}{5}C + 32$$

$$F = \frac{9}{5} \cdot 25 + 32$$

$$F = 45 + 32$$

$$F = 77^\circ$$

2. If $F^\circ = -22$, find C°

$$F = \frac{9}{5}C + 32$$

$$-22 = \frac{9}{5}C + 32$$

$$-54 = \frac{9}{5}C$$

$$-30^\circ = C$$

$$\begin{array}{r} -6 \\ -54 \cdot \frac{5}{9} \\ \hline \end{array}$$

3. What happens to the circumference of a circle if the radius is multiplied by 5?

$$C = 2\pi r$$

radius = 4

new radius = 20

$$C = 2\pi(4) \rightarrow 8\pi$$

$$C = 2\pi(20) \rightarrow 40\pi$$

Circumference is five times larger.

Writing Formulas

Best Bikes Rental

- Insurance fee \$650 ← constant/flat fee
- Daily Charge \$80 ← multiply by # of days
- Mileage Charge \$0.10 per mile ← multiply by # of miles

A. How much would it cost to rent a bike for 4 days and "drive" it 350 miles?

$$\text{Cost} = 650 + 80(4) + 0.10(350)$$

$$C = 650 + 320 + 35$$

$$C = \$1,005$$

B. Write a formula for calculating the total cost of a bike rental at Best Bikes.

$$C = \text{total cost}$$

$$d = \# \text{ of days}$$

$$m = \# \text{ of miles}$$

$$C = 650 + 80d + .1m$$

What procedure can we use to write a formula?

1. Define ALL variables
(dependent AND independent)
2. Write an equation relating all unknowns.

Examples:

1. Write a formula for calculating the cost of video rentals if each video costs \$1.50 to rent and there is a one time membership fee of \$50.00.

$$C = \text{total cost}$$

$$C = 1.5v + 50$$

$$v = \# \text{ of videos}$$

2. Write a formula for calculating the ticket sales if a theater charges \$7.50 per adult admission and \$3.50 per child admission.

$$S = \text{total sales}$$

$$a = \# \text{ of adults}$$

$$c = \# \text{ of children}$$

$$S = 7.50a + 3.50c$$

3. Write a formula calculating Stanley's salary for one day if he earns a daily salary of \$63.00 and \$8.50 per hour in overtime following 9 hours of work.

$$S = \text{total salary}$$

$$h = \# \text{ of hours}$$

$$\text{worked}$$

$$S = 63 + 8.5(h - 9)$$