

## Math 9

## Writing Expressions and Equations & Substitution

**Expression** – any combination of numbers and/or variables and operations.

**Ex.**  $2x + 3$

has no = sign

**Equation** – a mathematical statement with two expressions that have the same value.

**Ex.**  $2x + 3 = 5$

has an = sign

### Writing Expressions:

Write an **expression** to describe the following patterns:

Five is added to  $y$

$$\underline{y + 5}$$

The sum of  $w$  and ten

$$\underline{w + 10}$$

Seven less than a number

$$\underline{x - 7}$$

Four fifths of a number plus eight

$$\underline{\frac{4}{5}x + 8}$$

Add one half to three times a number

$$\underline{3x + \frac{1}{2}}$$

Subtract three from two times a number

$$\underline{2x - 3}$$

Dividing  $d$  by twenty five

$$\underline{d \div 25} \quad \frac{d}{25}$$

### Writing Equations

Write an **equation** to describe the following patterns.

A number minus two **is** ten

equal sign

$$\underline{x - 2 = 10}$$

The sum of  $d$  and four **gives** three

$$\underline{d + 4 = 3}$$

Five less than a number is thirty two

$$\underline{x - 5 = 32}$$

Three times a number is twenty

$$\underline{3x = 20}$$

A number divided by two is sixteen

$$\underline{x \div 2 = 16} \quad \text{OR} \quad \underline{\frac{x}{2} = 16}$$

Three divided by  $g$  is one

$$\underline{3 \div g = 1} \quad \text{OR} \quad \underline{\frac{3}{g} = 1}$$

One third of  $t$  is equal to five

$$\underline{\frac{1}{3}t = 5} \quad \text{OR} \quad \underline{\frac{t}{3} = 5}$$

Product of five and  $y$  **is the same as** ten

$$\underline{5y = 10}$$

**Substitution-** replacing the variable (letter) with a number.

**Ex.** Substitute  $x = 3$  into the following expressions.

*replace variable with (3) + evaluate.*

a)  $6x - 2$

$$\begin{aligned} &6(3) - 2 \\ &18 - 2 \\ &\boxed{16} \end{aligned}$$

b)  $-2x - 5(3x - 2)$

$$\begin{aligned} &-2(3) - 5(3(3) - 2) \\ &-6 - 5(9 - 2) \\ &-6 - 5(7) \\ &-6 - 35 \\ &\boxed{-41} \end{aligned}$$

c)  $\frac{18}{x} + 5 - 2x$

$$\begin{aligned} &\frac{18}{3} + 5 - 2(3) \\ &6 + 5 - 6 \\ &11 - 6 \\ &\boxed{5} \end{aligned}$$

**Questions:**

1)  $2x + 3$  where  $x = 4$

$$\begin{aligned} &2(4) + 3 \\ &8 + 3 \\ &\boxed{11} \end{aligned}$$

2)  $\frac{2x}{3} + 3$  where  $x = 12$

$$\begin{aligned} &\frac{2(12)}{3} + 3 \\ &\frac{24}{3} + 3 \\ &8 + 3 = \boxed{11} \end{aligned}$$

3)  $3(x - 7)$  where  $x = 15$

$$\begin{aligned} &3(15 - 7) \\ &3(8) \\ &\boxed{24} \end{aligned}$$

4)  $2x + 3y - 10$  where  $x = 5$  and  $y = 6$

$$\begin{aligned} &2(5) + 3(6) - 10 \\ &10 + 18 - 10 \\ &\boxed{18} \end{aligned}$$

5)  $4(2x + 3y)$  where  $x = 7$  and  $y = 10$

$$\begin{aligned} &4(2(7) + 3(10)) \\ &4(14 + 30) \\ &4(44) \\ &\boxed{176} \end{aligned}$$