Algebra I                          Name:_____ Block:_____ Date: _____

SOL A.8 Direct/Inverse Variation

Direct Variation: $y = kx$               Inverse Variation: $y = \dfrac{k}{x}$

| Direct/Inverse Variation |
| Worksheet |

Find the missing variable:

1) y varies **directly** with x. If y = -4 when x = 2, find y when x = -6.

$y = kx \rightarrow \dfrac{-4}{2} = \dfrac{k(2)}{2} \rightarrow k = -2$

$y = (-2)(-6)$
$\boxed{y = 12}$

2) y varies **inversely** with x. If y = 40 when x = 16, find x when y = -5.

$y = \dfrac{k}{x} \rightarrow 16 \cdot 40 = \dfrac{k}{16} \cdot 16 \quad k = 640 \qquad x \cdot -5 = \dfrac{640}{x} \cdot x$

$-5x = 640$
$\dfrac{-5x}{-5} = \dfrac{640}{-5}$
$\boxed{x = -128}$

Classify the following as **direct variation**, **inverse variation**, or **neither**.

3) m = -5p

Direct

4) $c = \dfrac{t}{-4}$

$-4c = t$
Direct

5) xy + 3 = 0

$\dfrac{xy}{x} = \dfrac{-3}{x}$
$y = \dfrac{-3}{x}$
~~Neither~~ inverse

6) $r = \dfrac{9}{d}$

inverse

7) n = 2x + 3

neither

8) $\dfrac{xy}{x} = \dfrac{5}{x}$
$y = \dfrac{5}{x}$ inverse

What is the constant of variation for the following?

9) d = 4t

$k = 4$

10) $z = \dfrac{-0.2}{t}$

$k = -0.2$

11) $n = \dfrac{x}{2}$   $n = \dfrac{1}{2}x$

$k = \dfrac{1}{2}$

12) The cost per person to rent a mountain cabin is inversely proportional (varies inversely) to the number of people who share the rent. If the cost is $36 per person when 5 people share, what is the cost per person when 8 people share?

$c = \dfrac{k}{n} \rightarrow 5 \cdot 36 = \dfrac{k}{5} \cdot 5 \qquad c = \dfrac{180}{8} \qquad \boxed{c = \$22.50}$
$k = 180$

13) The amount of money earned on a job is directly proportional (varies directly) to the number of hours worked. If $36 is earned for 8 hours of work, how much is earned for 30 hours of work?

$M = kh \rightarrow \dfrac{36}{8} = \dfrac{k(8)}{8} \rightarrow k = 4.5 \rightarrow M = (4.5)(30)$
$\boxed{M = \$135}$

Tell whether the table represent direct variation, inverse variation, or neither. If direct or inverse variation write the equation.

$y = \dfrac{25}{x}$  inverse

14)

| X | 2 | 5 | -2 | -5 | -1 |
|---|---|---|----|----|----|
| Y | 12.5 | 5 | -12.5 | -5 | -25 |

| x | -5 | -2 | -1 | 2 | 5 |
|---|----|----|----|---|---|
| y | -5 | -12.5 | -25 | 12.5 | 5 |

$-5 = \dfrac{k}{-5} \rightarrow k = 25 \qquad \rightarrow -12.5 = \dfrac{25}{-2}$

15)

| X | 2 | 4 | 6 | 8 | 10 |
|---|---|---|---|---|----|
| Y | 1 | 2 | 3 | 4 | 5 |

$y = kx$
$1 = k(2)$
$k = \frac{1}{2}$
direct
$y = \frac{1}{2}x$