

**Review – Quantitative Reasoning and Algebraic Models**

Name: Kelly

Date: \_\_\_\_\_

Period: \_\_\_\_\_

Solve each equation.

1.  $18 - c = -6$

$$\begin{array}{r} -18 \quad -18 \\ \hline -c = -24 \\ \hline -1 \quad -1 \\ \hline c = 24 \end{array}$$

2.  $73 = -6d + 7$

$$\begin{array}{r} -7 \quad -7 \\ \hline 66 = -6d \\ \hline -6 \quad -6 \\ \hline -11 = d \end{array}$$

3.  $\frac{1}{4}y + \frac{1}{3} = \frac{5}{12}$

$$\begin{array}{r} \frac{3}{12}y + \frac{4}{12} = \frac{5}{12} \\ -\frac{4}{12} \quad -\frac{4}{12} \\ \hline \frac{3}{12}y = \frac{1}{12} \\ \frac{3}{3} \cdot \frac{3}{12}y = \frac{1}{12} \cdot \frac{12}{3} \\ y = \frac{1}{3} \end{array}$$

4.  $9 - \frac{m}{3} = 20$

$$\begin{array}{r} -9 \quad -9 \\ \hline (-3) \cdot -\frac{m}{3} = 11 \cdot (-3) \\ \hline m = -33 \end{array}$$

5.  $2s + 4 = 5(-4 - 2s)$

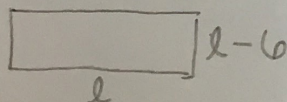
$$\begin{array}{r} 2s + 4 = -20 - 10s \\ +10s \quad +10s \\ \hline 12s + 4 = -20 \\ -4 \quad -4 \\ \hline 12s = -24 \\ s = -2 \end{array}$$

6.  $2(5 - d) = 2 - 4d$

$$\begin{array}{r} 10 - 2d = 2 - 4d \\ +4d \quad +4d \\ \hline 10 + 2d = 2 \\ -10 \quad -10 \\ \hline 2d = -8 \\ d = -4 \end{array}$$

Write an equation to fit the description, then solve the equation.

7. The perimeter of a rectangle is 60 meters. The width of the parallelogram is 6 meters less than its length. Find the length and the width of the parallelogram.



$$\begin{array}{l} 2l + 2w = P \\ 2l + 2(l-6) = 60 \\ 2l + 2l - 12 = 60 \end{array} \quad \begin{array}{r} 4l - 12 = 60 \\ +12 \quad +12 \\ \hline 4l = 72 \\ l = 18 \end{array}$$

Equation:  $2l + 2(l-6) = 60$  Length: 18 Width: 12

8. In one day, Annie traveled 5 times the sum of the number of hours Brian traveled and 2. Together they traveled 20 hours. Find the number of hours each person traveled.

Annie:  $5(x+2)$

Annie + Brian = 20

$$6x + 10 = 20$$

Brian:  $x$

$$5(x+2) + x = 20$$

$$\begin{array}{r} -10 \quad -10 \\ \hline 6x = 10 \end{array}$$

$$5x + 10 + x = 20$$

$$x = 10/6 = 5/3$$

Equation:  $5(x+2) + x = 20$  Annie: 5 1/3 hours Brian: 5/3 hours



9. Tina is saving to buy a notebook computer. She has two options. The first option is to put \$500 away initially and save \$10 every month. The second option is to put \$300 away initially and save \$30 every month. After how many months would Tina save the same amount using either option? How much would she save with either option?

Option 1:  $500 + 10m$

Option 2:  $300 + 30m$

$$\begin{array}{r} 500 + 10m = 300 + 30m \\ -10m \quad -10m \\ \hline 500 = 300 + 20m \\ -300 \quad -300 \\ \hline 200 = 20m \\ m = 10 \end{array}$$

Equation:  $500 + 10m = 300 + 30m$  Months: 10 money \$: 600

10. One month, Ruby worked 6 hours more than Isaac, and Svetlana worked 4 times as many hours as Ruby. Together they worked 138 hours. Find the number of hours each person worked.

Ruby:  $x + 6$

Isaac:  $x$

Svetlana:  $4(x + 6)$

Ruby + Isaac + Svetlana = 138

$x + 6 + x + 4(x + 6) = 138$

$x + 6 + x + 4x + 24 = 138$

$6x + 30 = 138$

$6x = 108$

$x = 18$

Equation:  $(x + 6) + x + 4(x + 6) = 138$  Ruby: 24 Isaac: 18 Svetlana: 96

Solve each of the following for the variable indicated.

11. Solve for  $w$ :  $C = \frac{wtc}{1000}$

$1000 \cdot C = \frac{wtc}{1000} \cdot 1000$

$\frac{1000C}{tc} = \frac{wtc}{tc}$

$1000C = w$

13. Solve for  $x$ :  $\frac{x}{11} - g = a$

$\frac{x}{11} - g = a$   
 $\frac{x}{11} + g = a + g$   
 $x = 11(a + g)$

$\frac{x}{11} = a + g$

12. Solve for  $j$ :  $\frac{h-10}{j} = k$

$j \cdot \frac{h-10}{j} = k \cdot j$

$\frac{h-10}{k} = j$

14. Solve for  $h$ :  $SA = 2\pi r^2 + 2\pi rh$

$SA - 2\pi r^2 = 2\pi rh$   
 $\frac{SA - 2\pi r^2}{2\pi r} = h$

15. The formula for the area of a triangle is  $A = \frac{1}{2}bh$  in which  $b$  represents the length of the base and  $h$  represents the height. If a triangle has an area of  $224 \text{ mm}^2$  and the height is  $14 \text{ mm}$ , what is the measure of the base?

$A = \frac{1}{2}bh$   
 $\frac{2A}{h} = b \rightarrow \frac{2(224)}{14} = b$

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

$32 = b$

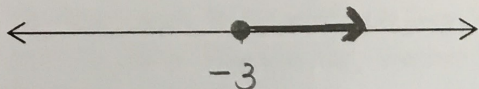
Formula:  $\frac{2A}{h} = b$  Base Measure: 32mm



Solve each inequality and graph your solution on a number line.

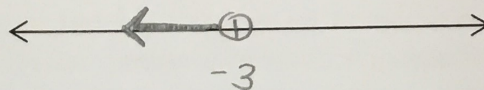
16.  $5 + 5(x + 6) \geq 20$

$$\begin{aligned} 5 + 5x + 30 &\geq 20 \\ 5x + 35 &\geq 20 \\ -35 \quad -35 & \\ \hline 5x &\geq -15 \\ x &\geq -3 \end{aligned}$$



17.  $9(x + 8) - 8(x + 5) < 29$

$$\begin{aligned} 9x + 72 - 8x - 40 &< 29 \\ x + 32 &< 29 \\ -32 \quad -32 & \\ \hline x &< -3 \end{aligned}$$



18. A crane cable can support a maximum load of 21,000 kg. If a bucket has a mass of 5,000 kg and gravel has a mass of 1,500 kg for every cubic meter, how many cubic meters of gravel (g) can be safely lifted by the crane? Enter any fractions as reduced improper fractions.

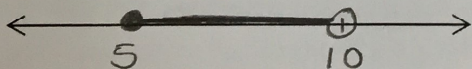
$$\begin{aligned} 1500g + 5000 &\leq 21,000 \\ -5000 \quad -5,000 & \\ \hline 1500g &\leq 16000 \\ \frac{1500g}{1500} &\leq \frac{16000}{1500} \end{aligned}$$

$g \leq \frac{32}{3}$

Inequality:  $1500g + 5000 \leq 21,000$  Solutions:  $g \leq \frac{32}{3}$   
Solve the compound inequality and graph the solutions.

19.  $0 \leq 2x - 10 < 10$

$$\begin{aligned} +10 \quad +10 \quad +10 & \\ \hline \frac{10}{2} \leq \frac{2x}{2} < \frac{20}{2} \\ 5 \leq x < 10 \end{aligned}$$



20.  $\frac{x}{5} - 2 < 7$  OR  $8x + 1 \geq 81$

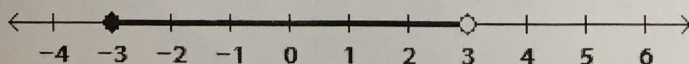
$$\begin{aligned} +2 \quad +2 & \\ \hline \frac{x}{5} &< 9 \\ x &< 45 \end{aligned}$$

$$\begin{aligned} 8x + 1 &\geq 81 \\ 8x &\geq 80 \\ x &\geq 10 \end{aligned}$$



Write the compound inequality shown by the graph.

21.



$$-3 \leq x < 3$$

Also acceptable:

$$x \geq -3 \text{ AND } x < 3$$