

Change the following into appropriate mathematical statements (expressions, equations, or inequalities).

1.) Five less than the square root of a number  $y$ .

$$\sqrt{y} - 5$$

2.) Twenty more than five times a number  $x$  is equal to one hundred.

$$5x + 20 = 100$$

3.) The quotient between  $a$  and  $b$  is at least seventeen.

$$\frac{a}{b} \geq 17$$

4.) The cube of a number  $w$  is more than the sum of a number  $f$  and 2.

$$w^3 > f + 2$$

Simplify the following expressions. If your answer is not an integer, express it as reduced fraction.

5.)  $17 - 4 + 3^2$

$$17 - 4 + 9$$

$$13 + 9$$

$$\boxed{22}$$

6.)  $\sqrt{10^2 - 8^2}$

$$\sqrt{100 - 64}$$

$$\sqrt{36}$$

$$\boxed{6}$$

7.)  $\frac{4 - 5 \cdot 4}{-2^2}$

$$\frac{4 - 20}{-4}$$

$$\frac{-16}{-4}$$

$$\frac{-16}{-4}$$

$$\boxed{4}$$

8.)  $7 - 2(4^2 \div 8 \cdot 2)$

$$7 - 2(16 \div 8 \cdot 2)$$

$$7 - 2(2 \cdot 2)$$

$$7 - 2(4)$$

$$7 - 8$$

$$\boxed{-1}$$

Solve the following inequalities and graph the solutions on a number line.

9.)  $-17 + 4x \geq -13$

$$+17 \quad +17$$

$$4x \geq 4$$

$$x \geq 1$$



10.)  $6x - 12 > 10x + 20$

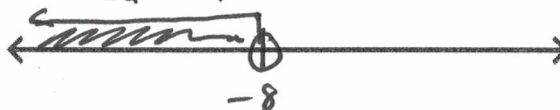
$$-10x \quad -10x$$

$$-4x - 12 > 20$$

$$+12 \quad +12$$

$$\frac{-4x}{-4} > \frac{32}{-4}$$

$$x < -8$$



Solve the following systems of linear equations. Use only the method listed with each.

11.)  $\begin{cases} x = 4y + 3 \\ 2x + 3y = 10 \end{cases}$

Substitution Method

$$2(4y + 3) + 3y = 10$$

$$8y + 6 + 3y = 10$$

$$11y + 6 = 10$$

$$-6 \quad -6$$

$$11y = 4$$

$$y = \frac{4}{11}$$

$$x = 4\left(\frac{4}{11}\right) + 3$$

$$x = \frac{16}{11} + 3$$

$$x = \frac{49}{11}$$

$$\boxed{\left(\frac{49}{11}, \frac{4}{11}\right)}$$

12.)  $\begin{cases} 2x + 3y = 180 \\ 2x + y = 90 \end{cases}$

Elimination Method

$$\begin{array}{r} 2x + 3y = 180 \\ -2x - y = -90 \\ \hline \end{array}$$

$$2y = 90$$

$$y = 45$$

$$2x + 45 = 90$$

$$2x = 45$$

$$x = 22.5$$

$$\boxed{(22.5, 45)}$$

In the following problems, solve the equations. If your answer is not an integer, express it as reduced fraction.

13.)  $p - 1 = 5p + 3p - 8$

$$\begin{aligned}
 p - 1 &= 8p - 8 \\
 -8p &\quad -8p \\
 -7p - 1 &= -8 \\
 +1 &\quad +1 \\
 -7p &= -7 \\
 \boxed{p = 1}
 \end{aligned}$$

15.)  $\frac{2}{3}(6w - 9) = -(2w - 5)$

$$\begin{aligned}
 4w - 6 &= -2w + 5 \\
 +2w &\quad +2w \\
 6w - 6 &= 5 \\
 +6 &\quad +6 \\
 6w &= 11 \\
 \boxed{w = \frac{11}{6}}
 \end{aligned}$$

17.)  $g + (2g + 1) + (3g - 7) = 180$

$$\begin{aligned}
 6g - 6 &= 180 \\
 6g &= 186 \\
 \boxed{g = 31}
 \end{aligned}$$

Factor the following quadratic expressions.

19.)  $x^2 - 5x - 6$

$$\begin{aligned}
 x^2 - 6x + 1x - 6 &\quad \boxed{(x - 6)(x + 1)} \\
 x(x - 6) + 1(x - 6) \\
 (x - 6)(x + 1)
 \end{aligned}$$

Factor and solve.

21.)  $x^2 - 13x - 48 = 0$

$$\begin{aligned}
 x^2 - 16x + 3x - 48 &= 0 \\
 x(x - 16) + 3(x - 16) &= 0 \\
 (x - 16)(x + 3) &= 0 \\
 x - 16 = 0 &\quad x + 3 = 0 \\
 \boxed{x = 16 \quad x = -3}
 \end{aligned}$$

14.)  $5x - 3(2x + 7) = 12$

$$\begin{aligned}
 5x - 6x - 21 &= 12 \\
 -1x - 21 &= 12 \\
 +21 &\quad +21 \\
 -1x &= 33 \\
 \boxed{x = -33}
 \end{aligned}$$

16.)  $180 - y = 5(90 - y)$

$$\begin{aligned}
 180 - y &= 450 - 5y \\
 +5y &\quad +5y \\
 180 + 4y &= 450 \\
 -180 &\quad -180 \\
 4y &= 270 \\
 \boxed{y = 67.5}
 \end{aligned}$$

18.)  $\frac{n-6}{n-7} \times \frac{9}{2}$

$$\begin{aligned}
 2(n-6) &= 9(n-7) \\
 2n - 12 &= 9n - 63 \\
 -9n &\quad -9n \\
 -7n - 12 &= -63 \\
 +12 &\quad +12 \\
 -7n &= -51 \\
 \boxed{n = \frac{51}{7}}
 \end{aligned}$$

20.)  $2x^2 + 3x - 20$

$$\begin{aligned}
 2x^2 + 8x - 5x - 20 \\
 2x(x + 4) - 5(x + 4) \\
 (x + 4)(2x - 5) \\
 \boxed{(x + 4)(2x - 5)}
 \end{aligned}$$

22.)  $n^2 + 7n + 15 = 5$

$$\begin{aligned}
 n^2 + 7n + 10 &= 0 \\
 n^2 + 5n + 2n + 10 &= 0 \\
 n(n + 5) + 2(n + 5) &= 0 \\
 (n + 5)(n + 2) &= 0 \\
 \boxed{n = -5 \quad n = -2}
 \end{aligned}$$

Each of the following problems contains a line in 3 forms: a table of values, an equation, and a graph. One or more parts is missing from each problem. Complete any of the missing information for each.

Problem #	Table of values (x,y)	Equation ( $y = mx + b$ form)	Graph												
23.)	<table border="1"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr> <td>-2</td> <td>-3</td> </tr> <tr> <td>-1</td> <td>-1</td> </tr> <tr> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>3</td> </tr> <tr> <td>2</td> <td>5</td> </tr> </tbody> </table>	x	y	-2	-3	-1	-1	0	1	1	3	2	5	$y = 2x + 1$	
x	y														
-2	-3														
-1	-1														
0	1														
1	3														
2	5														
24.)	<p>NOT ON GRAPH →</p> <table border="1"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr> <td>-6</td> <td>-8</td> </tr> <tr> <td>-3</td> <td>-6</td> </tr> <tr> <td>0</td> <td>-4</td> </tr> <tr> <td>3</td> <td>-2</td> </tr> <tr> <td>6</td> <td>0</td> </tr> </tbody> </table>	x	y	-6	-8	-3	-6	0	-4	3	-2	6	0	$y = \frac{2}{3}x - 4$	
x	y														
-6	-8														
-3	-6														
0	-4														
3	-2														
6	0														
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x	y														
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