

Name \_\_\_\_\_  
Geometry-9 Summer 2017 Assignment

Dear incoming 9<sup>th</sup> grade Geometry student,

Congratulations! Your enrollment in Sussex Technical High School's Geometry-9 course is about to begin this summer. It is important to us, as your teachers, that you are prepared and ready for this mathematical journey. To be successful in our 9<sup>th</sup> grade course, it is important that you have had an 8<sup>th</sup> grade equivalent of Algebra I. We have designed an assignment for you to complete before the first day of school that reviews the topics in Algebra I that we feel are a must know how to do and will validate that Algebra I course prerequisite. Although this assignment will not be collected and graded, you will be given a summative assessment on its content on the ***second day of class***.

Attached in this document you will find all that you need to complete this assignment. For starters, you will find tutorials that will help you refresh those skills in the assignment. Next you will find mini-practice sets of problems that practice those skills. Finally, you will find the solutions worked out in detail to every problem in this assignment. Consider these solutions models to how your work evidence should look when we assess you on the ***second day of class***.

If the included tutorials and solutions are not sufficient then please contact our Student Services Department at 302-856-0961 as soon as possible to discuss your placement in the appropriate mathematics class that will launch your four-year stay with us here at Sussex Technical High School.

Sincerely,

Geometry-9 Teachers  
Sussex Technical High School

## SOLVING MULTI-STEP EQUATIONS

**Key Skills** 

Use the distributive property to solve multistep equations.

$$\text{Solve } 8x - 2(3x - 4) = 5x - 7.$$

$$8x - 2(3x - 4) = 5x - 7$$

$$8x + (-2)(3x) + (-2)(-4) = 5x - 7$$

$$8x - 6x + 8 = 5x - 7$$

$$2x + 8 = 5x - 7$$

$$2x + 8 - 2x = 5x - 7 - 2x$$

$$8 = 3x - 7$$

$$8 + 7 = 3x - 7 + 7$$

$$15 = 3x$$

$$\frac{15}{3} = \frac{3x}{3}$$

$$5 = x$$

Distributive Property

Simplify.

Simplify.

Subtraction Property of Equality

Simplify.

Addition Property of Equality

Simplify.

Division Property of Equality

Simplify.

**Exercises** 

Solve.

1.  $5(a + 3) = 35$  \_\_\_\_\_

2.  $4(2 - c) = -4$  \_\_\_\_\_

3.  $3m - 2(2m + 4) = 16$  \_\_\_\_\_

4.  $39 = 3(p - 1)$  \_\_\_\_\_

5.  $8 - 3(2 - s) = 1 + 2s$  \_\_\_\_\_

6.  $3(b + 1) = 4b - 2(b - 3)$  \_\_\_\_\_

7.  $h - (2h + 4) = 5(h - 1) + 3$  \_\_\_\_\_

8.  $\frac{1}{2}(5 - 2k) = 6(k + 4)$  \_\_\_\_\_

9.  $-2(w - 7) - (1 - w) = 2(1 + w) + w - 3$  \_\_\_\_\_

10.  $x(9.8 - 2.1) = 6.5 + 1.2x$  \_\_\_\_\_

## SOLVING PROPORTIONS

**Key Skills** **Solve a proportion.**

Solve  $\frac{14}{32} = \frac{x}{80}$ .

**Method A**

$$\frac{14}{32} = \frac{x}{80}$$

$$80\left(\frac{14}{32}\right) = 80\left(\frac{x}{80}\right)$$

$$\frac{1120}{32} = x$$

$$35 = x$$

**Method B**

$$\frac{14}{32} = \frac{x}{80}$$

$$14 \cdot 80 = 32x$$

$$\frac{14 \cdot 80}{32} = x$$

$$35 = x$$

**Exercises** **Solve each proportion.**

1.  $\frac{18}{12} = \frac{x}{16}$  \_\_\_\_\_

2.  $\frac{42}{y} = \frac{78}{13}$  \_\_\_\_\_

3.  $\frac{28}{n} = \frac{12}{15}$  \_\_\_\_\_

4.  $\frac{54}{9.72} = \frac{x}{0.9}$  \_\_\_\_\_

5.  $\frac{45}{15} = \frac{18}{k}$  \_\_\_\_\_

6.  $\frac{8.4}{3} = \frac{14}{n}$  \_\_\_\_\_

7.  $\frac{w}{5} = \frac{28}{35}$  \_\_\_\_\_

8.  $\frac{b}{7} = \frac{35}{24.5}$  \_\_\_\_\_

## LINEAR FUNCTIONS: SLOPE INTERCEPT FORM OF A LINE

### Key Skills *~~~~~*

**Find an equation in slope-intercept form for a line.**

Write an equation in slope-intercept form for the line that contains  $(-1, 3)$  and  $(2, -3)$ .

First, find  $m$ .  $m = \frac{-3 - 3}{2 - (-1)} = -2$

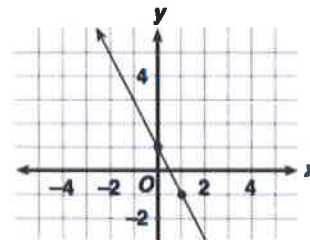
Substitute for  $x, y,$  and  $m$  in the equation  $y = mx + b$ .

$$3 = -2(-1) + b; b = 1 \rightarrow y = -2x + 1$$

**Graph an equation in slope-intercept form.**

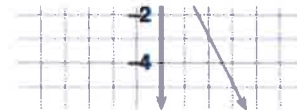
To graph  $y = -2x + 1$ , use the  $y$ -intercept, 1, to graph  $(0, 1)$ .

The slope is  $-2$ , so move 1 unit right and 2 units down to locate  $(1, -1)$ . Draw the line through  $(0, 1)$  and  $(1, -1)$ .



### Exercises *~~~~~*

Write an equation in slope-intercept form for the line that is described.



1. a slope of  $-7$  and a  $y$ -intercept of 5

2. a slope of  $-\frac{5}{8}$  and a  $y$ -intercept of 2

3. contains  $(0, 9)$  and has a slope of  $-4$

4. contains  $(0, -8)$  and  $(5, -6)$

5. contains  $(-5, -2)$  and  $(10, 1)$

Graph each equation on your own paper.

6.  $y = -\frac{1}{3}x + 3$

7.  $y = 3x - 4$

8.  $y = \frac{4}{5}x$

9.  $y = -\frac{3}{2}x - 2$

## LINEAR FUNCTIONS: PARALLEL & PERPENDICULAR LINES

### Key Skills

**Recognize and write equations of lines parallel or perpendicular to other lines.**

Write an equation in slope-intercept form for the line that contains the point  $(0, 9)$  and is

- parallel to the line  $x - 5y = 4$ .
- perpendicular to the line  $x - 5y = 4$ .

Write the equation  $x - 5y = 4$  in slope-intercept form.

$$y = \frac{1}{5}x - \frac{4}{5} \quad \text{The slope is } \frac{1}{5}.$$

The slope of a parallel line is  $\frac{1}{5}$ . The slope of any perpendicular line is the negative reciprocal of  $\frac{1}{5}$ ,  $-5$ .

- The slope is  $\frac{1}{5}$  and the y-intercept is 9.  $y = \frac{1}{5}x + 9$
- The slope is  $-5$  and the y-intercept is 9.  $y = -5x + 9$

### Exercises

Find the slope of the line that is

- |  |   |
|--|---|
| 1. parallel to the<br>line $y = \frac{5}{12}x - 3$ . _____ | 2. perpendicular to the<br>line $y = -10x + 12$ . _____ |
| 3. parallel to the<br>line $2x - y = 13$ . _____           | 4. perpendicular to the<br>line $x - y = 15$ . _____    |

Write an equation for a line that

- contains  $(0, -3)$  and is parallel to the line  $y = \frac{5}{8}x - 2$ . \_\_\_\_\_
- contains  $(2, 6)$  and is perpendicular to the line  $y = \frac{1}{2}x + 4$ . \_\_\_\_\_
- contains  $(0, 1)$  and is parallel to the line  $5x - 2y = 10$ . \_\_\_\_\_

## MULTIPLYING POLYNOMIALS

**Key Skills** 

Use the **Distributive Property** to find the product of a monomial and a binomial.

Find the product  $2x(x - 13)$ .

$$2x(x - 13) = (2x \cdot x) - (2x \cdot 13) = 2x^2 - 26x$$

Use the rules for special products to find the product of two binomials.

Find the product  $(2x - 7)^2$ .

$$\begin{aligned} (2x - 7)^2 &= (2x)^2 - 2(2x)(7) + 7^2 \\ &= 4x^2 - 28x + 49 \end{aligned}$$

**Key Skills** 

Multiply two binomials by using the **Distributive Property** or the **FOIL method**.

Use the **Distributive Property** to find  $(x + 10)(x - 3)$ .

$$\begin{aligned} (x + 10)(x - 3) &= x(x - 3) + 10(x - 3) \\ &= x^2 - 3x + 10x - 30 \\ &= x^2 + 7x - 30 \end{aligned}$$

Use the **FOIL method** to find  $(7w - 2)(3w + 1)$ .

$$(7w - 2)(3w + 1) = 7w^2 + 7w - 2w - 2$$

**Exercises** 

Find each product.

1.  $15(2x - 4)$  \_\_\_\_\_

2.  $-8(-3x + 5)$  \_\_\_\_\_

3.  $-3x(5x + 12)$  \_\_\_\_\_

4.  $(x + 1.5)(x - 1.5)$  \_\_\_\_\_

5.  $(x + 11)^2$  \_\_\_\_\_

6.  $(x - 10)^2$  \_\_\_\_\_

7.  $(3x - 5)^2$  \_\_\_\_\_

8.  $(6x + 1)^2$  \_\_\_\_\_

9.  $(4x - 7)(4x + 7)$  \_\_\_\_\_

# SOLUTIONS

## SOLVING MULTI-STEP EQUATIONS

$$\textcircled{1} \quad 5(a+3) = 35$$

$$5a + 5 \cdot 3 = 35$$

$$5a + 15 = 35$$

$$\begin{array}{r} -15 \quad -15 \\ \hline \end{array}$$

$$\frac{5a}{5} = \frac{20}{5}$$

$$\boxed{a = 4}$$

$$\text{check: } 5(4+3) = 35$$

$$5(\checkmark 7) = 35$$

$$\checkmark 35 = 35 \quad \checkmark$$

$$\textcircled{2} \quad 4(2-c) = -4$$

$$4 \cdot 2 - 4 \cdot c = -4$$

$$8 - 4c = -4$$

$$\begin{array}{r} -8 \quad \quad -8 \\ \hline \end{array}$$

$$\frac{-4c}{-4} = \frac{-12}{-4}$$

$$\boxed{c = 3}$$

$$\text{check: } 4(2-3) = -4$$

$$4(\checkmark -1) = -4$$

$$-4 = -4 \quad \checkmark$$

$$\textcircled{3} \quad 3m - 2(2m+4) = 16$$

$$3m - 2 \cdot 2m - 2 \cdot 4 = 16$$

$$3m - 4m - 8 = 16$$

$$\begin{array}{r} -1m \quad -8 = 16 \\ \hline \end{array}$$

$$\begin{array}{r} +8 \quad +8 \\ \hline \end{array}$$

$$\frac{-1m}{-1} = \frac{24}{-1}$$

$$\boxed{m = -24}$$

$$\text{check: } 3(-24) - 2(2(-24)+4) = 16$$

$$-72 - 2(-48+4) = 16$$

$$-72 - 2(-44) = 16$$

$$-72 + 88 = 16$$

$$16 = 16 \quad \checkmark$$

$$\begin{aligned}
 4. \quad 39 &= 3(p-1) \\
 39 &= 3p - 3 \cdot 1 \\
 39 &= 3p - 3 \\
 +3 & \quad +3 \\
 \hline
 42 &= 3p \\
 \frac{42}{3} &= \frac{3p}{3} \\
 \boxed{14} &= p
 \end{aligned}$$

Check:

$$\begin{aligned}
 39 &= 3((14)-1) \\
 39 &= 3(13) \\
 39 &= 39 \checkmark
 \end{aligned}$$

$$\begin{aligned}
 5. \quad 8 - 3(2-s) &= 1 + 2s \\
 8 - 3 \cdot 2 - 3 \cdot -s &= 1 + 2s \\
 8 - 6 + 3s &= 1 + 2s \\
 \hline
 2 + 3s &= 1 + 2s \\
 -2s & \quad -2s \\
 \hline
 2 + 16 &= 1 \\
 -2 & \quad -2 \\
 \hline
 \boxed{1s} &= -1
 \end{aligned}$$

Check:

$$\begin{aligned}
 8 - 3(2 - (-1)) &= 1 + 2(-1) \\
 8 - 3(2 + 1) &= 1 + 2(-1) \\
 8 - 3(3) &= 1 + 2(-1) \\
 8 - 9 &= 1 - 2 \\
 -1 &= -1 \checkmark
 \end{aligned}$$

$$\begin{aligned}
 6. \quad 3(b+1) &= 4b - 2(b-3) \\
 3 \cdot b + 3 \cdot 1 &= 4b - 2 \cdot b - 2 \cdot (-3) \\
 3b + 3 &= 4b - 2b + 6 \\
 \hline
 3b + 3 &= 2b + 6 \\
 -2b & \quad -2b \\
 \hline
 1b + 3 &= 6 \\
 -3 & \quad -3 \\
 \hline
 \boxed{1b} &= 3
 \end{aligned}$$

Check:

$$\begin{aligned}
 3(3+1) &= 4(3) - 2(3-3) \\
 3(4) &= 12 - 2(0) \\
 12 &= 12 - 0 \\
 12 &= 12 \checkmark
 \end{aligned}$$



$$\begin{aligned} \textcircled{7} \quad h - (2h + 4) &= 5(h - 1) + 3 \\ h - 1(2h + 4) &= 5 \cdot h - 5 \cdot 1 + 3 \\ h - 1 \cdot 2h - 1 \cdot 4 &= 5h - 5 + 3 \\ \underline{1h - 2h - 4} &= \underline{5h - 5 + 3} \end{aligned}$$

$$\begin{array}{r} -1h - 4 = 5h - 2 \\ +1h \qquad \qquad +1h \\ \hline \end{array}$$

$$\begin{array}{r} -4 = 6h - 2 \\ +2 \qquad \qquad +2 \\ \hline \end{array}$$

$$\begin{array}{r} -2 = 6h \\ 6 \qquad \qquad 6 \end{array}$$

$$\boxed{-\frac{1}{3} = h}$$

Check:

$$\left(-\frac{1}{3}\right) - \left(2\left(-\frac{1}{3}\right) + 4\right) = 5\left(\left(-\frac{1}{3}\right) - 1\right) + 3$$

$$\left(-\frac{1}{3}\right) - \left(-\frac{2}{3} + 4\right) = 5\left(-1\frac{1}{3}\right) + 3$$

$$-\frac{1}{3} - 3\frac{1}{3} = 5 \cdot -\frac{4}{3} + 3$$

$$-3\frac{2}{3} = -\frac{20}{3} + 3$$

$$-3\frac{2}{3} = -6\frac{2}{3} + 3$$

$$-3\frac{2}{3} = -3\frac{2}{3} \quad \checkmark$$

8

$$\frac{1}{2}(5 - 2k) = 6(k + 4)$$
$$\frac{1}{2} \cdot 5 - \frac{1}{2} \cdot 2k = 6 \cdot k + 6 \cdot 4$$

$$\frac{5}{2} - 1k = 6k + 24$$
$$\frac{5}{2} + 1k = 7k + 24$$

$$\frac{5}{2} = 7k + 24$$
$$-24 = 7k - 24$$

$$-21\frac{1}{2} = 7k$$

$$-\frac{43}{2} \cdot \frac{1}{7} = k$$

✓

$$\boxed{-\frac{43}{14} = k}$$

check ✓

$$\frac{1}{2}(5 - 2(-\frac{43}{14})) = 6(-\frac{43}{14} + 4)$$

$$\frac{1}{2}(5 - \frac{-43}{7}) = 6(-3\frac{1}{14} + 4)$$

$$\frac{1}{2}(5 + 6\frac{1}{7}) = 6(\frac{13}{14})$$

$$\frac{1}{2}(11\frac{1}{7}) = \frac{78}{14}$$

$$\frac{1}{2}(\frac{78}{7}) = \frac{78}{14}$$

$$\frac{78}{14} = \frac{78}{14} \checkmark \checkmark$$

$$\begin{aligned}
 9. \quad & -2(w-7) - 1(1-w) = 2(1+w) + w - 3 \\
 & -2w - 2 \cdot 7 - 1 \cdot 1 - 1 \cdot w = 2 \cdot 1 + 2w + w - 3 \\
 & -2w + 14 - 1 + w = \underbrace{2 + 2w + w - 3} \\
 & \begin{array}{r} -1w + 13 \\ +1w \end{array} = \begin{array}{r} 3w - 1 \\ +1w \end{array}
 \end{aligned}$$

$$\begin{array}{r} 13 = 4w - 1 \\ +1 \qquad +1 \\ \hline 14 = 4w \\ 4 \qquad 4 \end{array}$$

$$\boxed{\frac{7}{2} = w}$$

Check:

$$-2\left(\frac{7}{2} - 7\right) - \left(1 - \frac{7}{2}\right) = 2\left(1 + \frac{7}{2}\right) + \left(\frac{7}{2}\right) - 3$$

$$-2\left(-\frac{7}{2}\right) - \left(-\frac{5}{2}\right) = 2\left(\frac{9}{2}\right) + \frac{7}{2} - 3$$

$$7 + \frac{5}{2} = 9 + \frac{7}{2} - 3$$

$$\frac{19}{2} = \frac{19}{2} \quad \checkmark$$

$$9.5 = 9.5 \quad \checkmark$$

$$\textcircled{10} \quad x(9.8 - 2.1) = 6.5 + 1.2x$$

$$7.7x = 6.5 + 1.2x$$

$$\begin{array}{r} -1.2x \\ \hline \end{array}$$

$$\begin{array}{r} 6.5x = 6.5 \\ \hline 6.5 \quad 6.5 \end{array}$$

$$\boxed{x = 1}$$

$$\text{check: } 1(9.8 - 2.1) = 6.5 + 1.2(1)$$

$$1(7.7) = 6.5 + 1.2$$

$$7.7 = 7.7 \quad \checkmark$$

## Solving Proportions Solutions

$$1. \frac{18}{12} = \frac{z}{16}$$

$$12 \cdot z = 18 \cdot 16$$

$$\frac{12 \cdot z}{12} = \frac{288}{12}$$

$$\boxed{z = 24}$$

$$2. \frac{42}{y} = \frac{78}{13}$$

$$78y = 42 \cdot 13$$

$$\frac{78y}{78} = \frac{546}{78}$$

$$\boxed{y = 7}$$

$$3. \frac{28}{n} = \frac{12}{15}$$

$$12 \cdot n = 180$$

$$\frac{12 \cdot n}{12} = \frac{180}{12}$$

$$\boxed{n = 35}$$

$$4. \frac{54}{9.72} = \frac{x}{0.9}$$

$$9.72 \cdot x = 48.6$$

$$\frac{9.72 \cdot x}{9.72} = \frac{48.6}{9.72}$$

$$\boxed{x = 5}$$

$$5. \frac{45}{15} = \frac{18}{k}$$

$$45 \cdot k = 15 \cdot 18$$

$$45k = 270$$

$$\frac{45 \cdot k}{45} = \frac{270}{45}$$

$$\boxed{k = 6}$$

$$6. \frac{8.4}{3} = \frac{14}{n}$$

$$8.4 \cdot n = 14 \cdot 3$$

$$8.4n = 42$$

$$\frac{8.4n}{8.4} = \frac{42}{8.4}$$

$$\boxed{n = 5}$$

$$7. \frac{w}{5} = \frac{28}{35}$$

$$35 \cdot w = 140$$

$$\frac{35 \cdot w}{35} = \frac{140}{35}$$

$$\boxed{w = 4}$$

$$8. \frac{b}{7} = \frac{35}{24.5}$$

$$24.5b = 245$$

$$\boxed{b = 10}$$

## Linear Functions : SLOPE

$$1. \frac{\text{rise}}{\text{run}} = \frac{12}{36} = \boxed{\frac{1}{3}}$$

$$2. \frac{\text{rise}}{\text{run}} = \frac{27}{-9} = -3 \text{ OR } \boxed{-3}$$

$$3. \frac{\text{rise}}{\text{run}} = \frac{28}{7} = \boxed{4}$$

$$4. m = \frac{15-8}{6-(-8)} = \frac{7}{14} = \boxed{\frac{1}{2}}$$

$$5. m = \frac{31-22}{9-12} = \frac{9}{-3} = \boxed{-3}$$

$$6. \frac{4-10}{4-(-12)} = \frac{-6}{16} = \boxed{\frac{-3}{8}}$$

## Linear Functions : Slope Intercept form of a Line

$$1. y = mx + b \quad m = -7 \text{ and } b = 5$$
$$\boxed{y = -7x + 5}$$

$$2. y = mx + b \quad m = -\frac{5}{8} \text{ and } b = 2$$
$$\boxed{y = -\frac{5}{8}x + 2}$$

$$3. y = mx + b \quad m = -\frac{5}{8} \text{ and point } (0, 9) \text{ which is the y-intercept}$$
$$\boxed{y = -\frac{5}{8}x + 9}$$

$$4. y = mx + b \quad (0, -8) \text{ and } (5, -6)$$

① find slope  $m = \frac{-6 - (-8)}{5 - 0} = \frac{2}{5}$

$$\boxed{y = \frac{2}{5}x - 8}$$

② y-intercept is  $(0, -8)$

5.  $y = mx + b$  Contains  $(-5, -2)$  and  $(10, 1)$   
 $y = \frac{1}{5}x - 1$

① find the slope.

$$m = \frac{1 - (-2)}{10 - (-5)} = \frac{3}{15} = \frac{1}{5}$$

② Substitute  $m = \frac{1}{5}$  and one of the ordered pairs in the  $x$  and  $y$

$$y = mx + b$$

$$(1) = \left(\frac{1}{5}\right)(10) + b$$

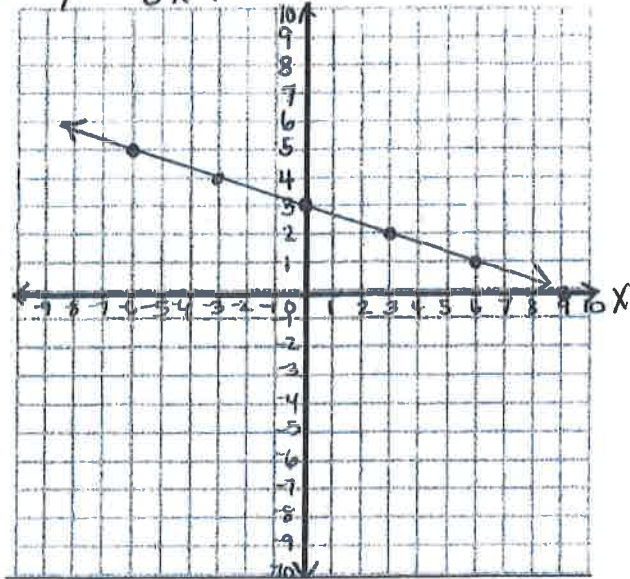
$$1 = 2 + b$$

$$-2 \quad -2$$

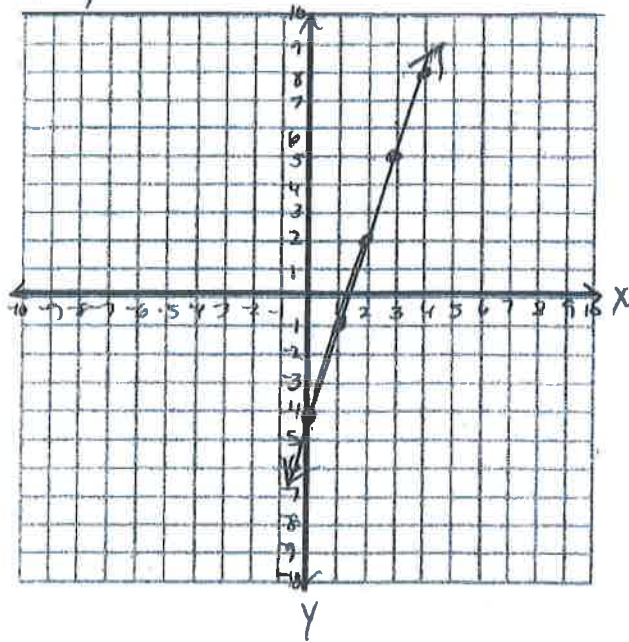
$$\boxed{-1 = b}$$

③ Rewrite  $y = mx + b$  with  $m = \frac{1}{5}$  and  $b = -1$

6.  $y = -\frac{1}{3}x + 3$

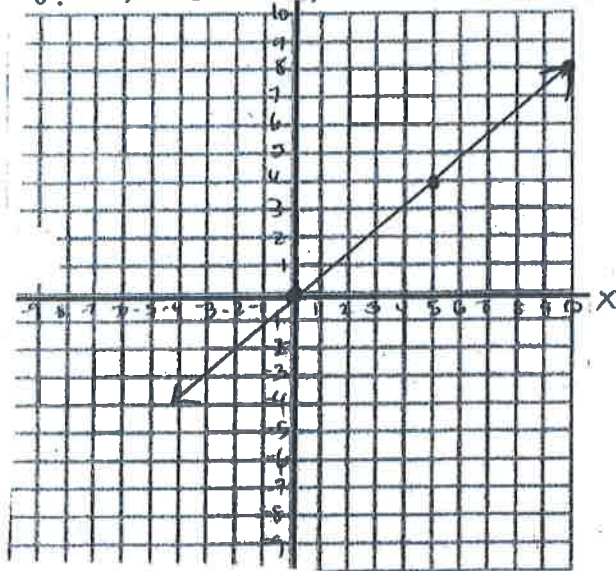


7.  $y = 3x - 4$

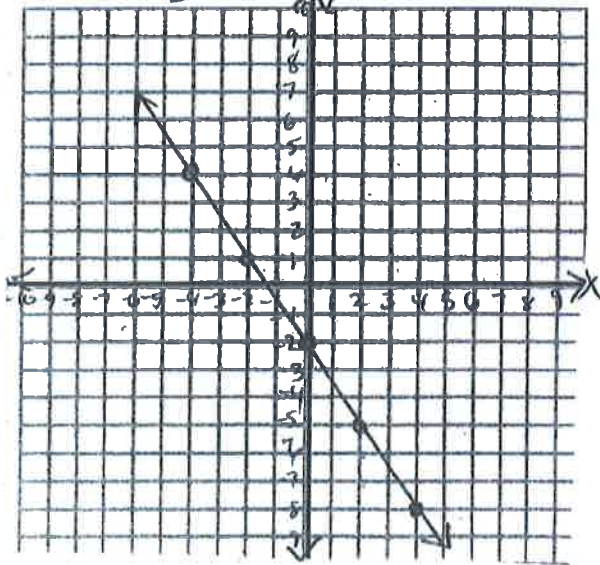




8.  $y = \frac{4}{5}x$



9.  $y = -\frac{3}{2}x + 2$



LINEAR FUNCTIONS: PARALLEL & PERPENDICULAR LINES

①  $\frac{5}{12}$

②  $\frac{1}{10}$

③  $-y = -2x + 13$

$y = 2x - 13$

slope: 2

④  $-y = -x + 15$

$y = x - 15$

slope  $\perp$ : -1

⑤  $m = \frac{5}{8}$  (0, -3) so  $b = -3$

OR:

$y = mx + b$

$-3 = \frac{5}{8}(0) + b$

$-3 = b$

EQ:  $y = \frac{5}{8}x - 3$

⑥  $m = -2$  (2, 6)

$y = mx + b$

$6 = -2(2) + b$

$6 = -4 + b$

$10 = b$

EQ:  $y = -2x + 10$

⑦  $-2y = -5x + 10$

$y = \frac{5}{2}x - 5$

$m = \frac{5}{2}$  (0, 1)  $b = 1$

EQ:  $y = \frac{5}{2}x + 1$

## MULTIPLYING POLYNOMIALS

$$\textcircled{1} \quad 15(2x - 4)$$

$$30x - 60$$

$$\textcircled{2} \quad -8(-3x + 5)$$

$$24x - 40$$

$$\textcircled{3} \quad -3x(5x + 12)$$

$$-15x^2 - 36x$$

$$\textcircled{4} \quad (x + 1.5)(x - 1.5)$$

$$x^2 - 1.5x + 1.5x - 2.25$$

$$x^2 - 2.25$$

$$\textcircled{5} \quad (x + 11)(x + 11)$$

$$x^2 + 11x + 11x + 121$$

$$x^2 + 22x + 121$$

$$\textcircled{6} \quad (x - 10)(x - 10)$$

$$x^2 - 10x - 10x + 100$$

$$x^2 - 20x + 100$$

$$\textcircled{7} \quad (3x - 5)(3x - 5)$$

$$9x^2 - 15x - 15x + 25$$

$$9x^2 - 30x + 25$$

$$\textcircled{8} \quad (6x+1)(6x+1)$$

$$36x^2 + 6x + 6x + 1$$

$$36x^2 + 12x + 1$$

$$\textcircled{9} \quad (4x-7)(4x+7)$$

$$16x^2 + 28x - 28x - 49$$

$$16x^2 - 49$$