

Math 10 Foundations LG 9/10 Quiz Ver. B Answer Sheet

Instructions

1. Mark your quiz.
2. Complete the "How Did I Do?" sheet.
3. Return this sheet to Mrs. Craig.
4. Bring your marked quiz and the "How Did I Do?" page to your teacher for a quick interview.

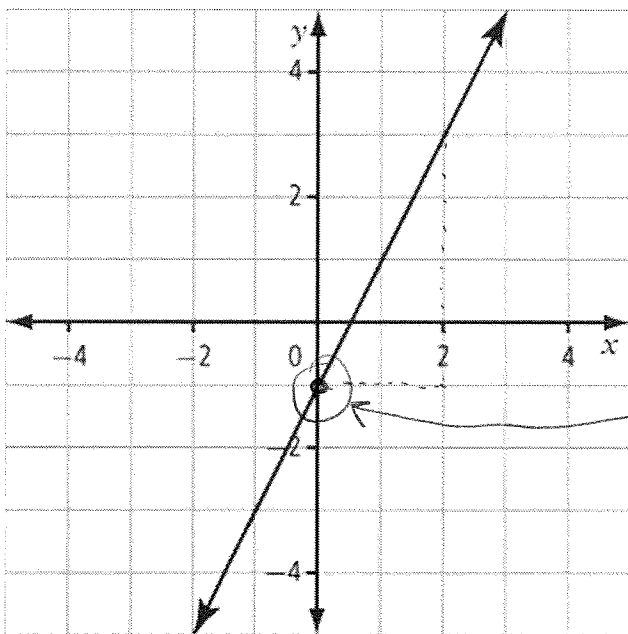
Foundations of Math 10 LG 9&10 Version B

/25

1. Expectation #1: Identify the slope and y-intercept of a straight-line graph.

What are the slope and y-intercept of this line?

(1 mark)



$$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{4}{2} = \frac{2}{1} = \underline{\underline{2}}$$

$$\text{y-intercept} = (0, -1)$$

2. Expectation #2: Use slope-intercept form to graph, determine a line's equation, and solve problems.

What is the slope of the line $y = -4x - 7$

(1 mark)

$$y = \overset{\uparrow}{m}x + b$$

$$\text{Slope} = -4 = \underline{\underline{-\frac{4}{1}}}$$

12

3. Identify the slope and y-intercept of the relation represented by the equation $12x - 9y + 2 = 0$. (1 mark)

Change to $y = mx + b$ form: $12x - 9y + 2 = 0$

$$\begin{array}{r} -12x \quad -2 \\ \hline -9y = -12x - 2 \\ \hline y = \frac{12}{9}x + \frac{2}{9} \\ y = \frac{4}{3}x + \frac{2}{9} \end{array}$$

Slope = $m = \frac{4}{3}$

y-intercept = $\frac{2}{9} = 0.\bar{2}$

(1 mark)

4. Write the equation $8x - 4y - 12 = 0$ in slope-intercept form

is: $y = mx + b$

$$\begin{array}{r} 8x - 4y - 12 = 0 \\ -8x \quad +12 \\ \hline -4y = -8x + 12 \\ \hline y = 2x - 3 \end{array}$$

$y = 2x - 3$

5. Expectation #3: Convert a linear equation to general form and use it to solve problems.

Write the equation in general form for the line with slope 3 and y-intercept -4. (1 mark)

Substitute into $y = mx + b$ to get an equation:

Step 1: $y = 3x - 4$ → Step 2: $y = 3x - 4$

General Form: $Ax + By + C = 0$

$$\begin{array}{r} -y \quad -y \\ \hline 0 = 3x - y - 4 \\ \hline \text{OR: } 3x - y - 4 = 0 \end{array}$$

6. Expectation #4: Use intercepts to graph a line and relate the intercepts to a situation.

Determine the y-intercept of the line $y = 3 - x$. (1 mark) in form: $y = mx + b$

rewrite? as $y = -x + 3$ → y-intercept

y-intercept = 3

7. What is the equation of the horizontal line that passes through the point (3, 4)? (1 mark)

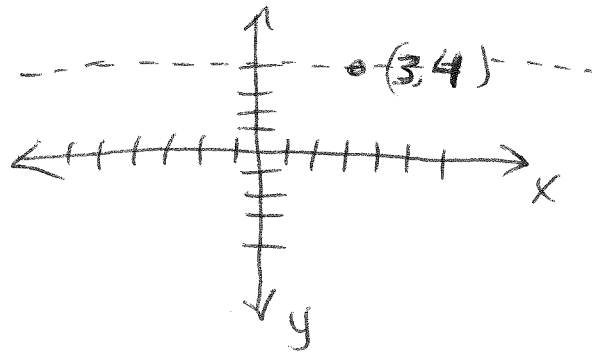
In slope y-intercept form:

$$\underline{y = 4}$$

OR

In general form:

$$\underline{\underline{y - 4 = 0}}$$



8. What is the value of p in the equation of the line $px + 2y + 12 = 0$, such that the x -intercept is 4? (1 mark)

IF x intercept is 4 this means
the point is: (4, 0)

So, $px + 2y + 12 = 0$ with substitution
of (4, 0) is:

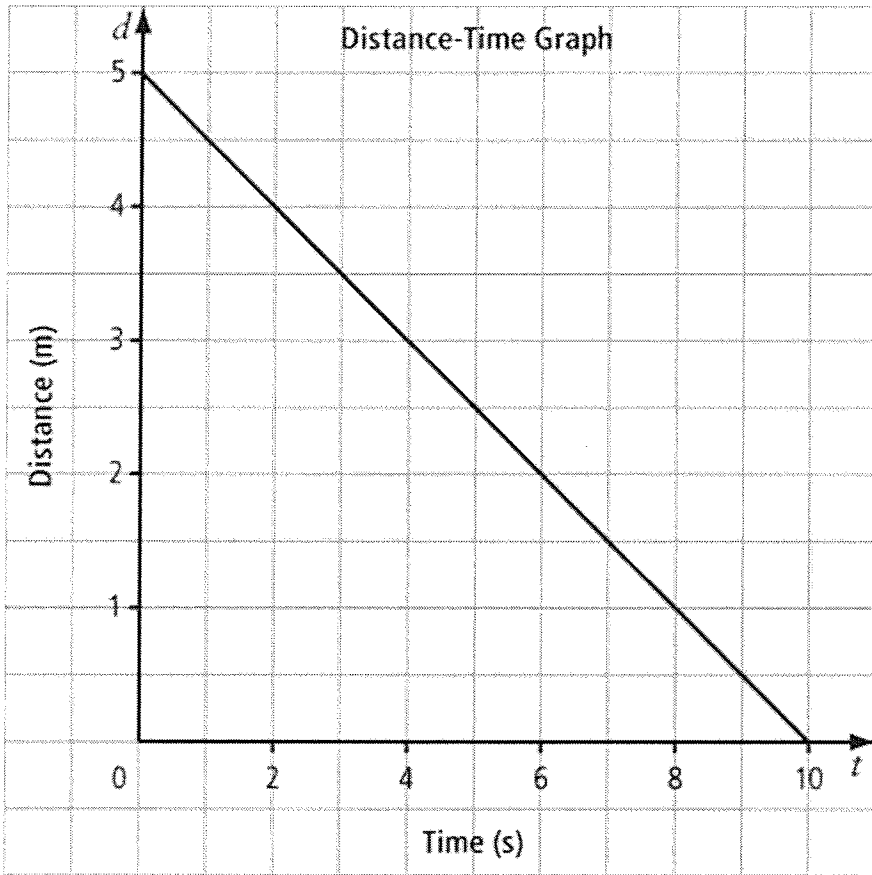
$$p(4) + 2(0) + 12 = 0$$

$$4p + 12 = 0$$

$$\div \frac{4p}{4} = \frac{-12}{4} \div$$

$$\underline{\underline{p = -3}}$$

9. The distance-time graph shows Tracy's distance from a video camera, where d represents her distance from the camera, in metres, and t represents time, in seconds. (3 marks)



- a) Identify the d -intercept on the vertical axis and explain what it means.

d -intercept is $(0, 5)$, this means at 0 seconds Tracy is 5 metres away from the camera

- b) Identify the t -intercept on the horizontal axis and explain what it means.

t -intercept is $(10, 0)$, this means after 10 seconds Tracy is 0 metres away from the camera

- c) What is the equation of the line, in general form?

Given: $m = -\frac{1}{2}$ (from the graph) and y -intercept or d -intercept is 5 or $(0, 5)$, so equation written in $y = mx + b$ form or

$$d = mt + b$$

is: $d = -\frac{1}{2}t + 5$

OR in general form: $t + 2d - 10 = 0$

10. Expectation #5: Use slope-point form to determine a line's equation, and solve problems.

Determine an equation for the line with slope 4 and passing through the origin. (1 mark)

So slope = $m = 4$ and y -intercept = 0 since the origin is $(0, 0)$; so $y = mx + b \rightarrow \underline{\underline{y = 4x + 0}}$ OR

use: $m(x - x_1) = y - y_1$
 $4(x - 0) = y - 0$
 $4x = y$

11. What is an equation for the line that passes through points $(2, 3)$ and $(4, 5)$? (1 mark)

First: Find $m = \frac{5-3}{4-2} = \frac{2}{2} = 1$ Then use Point-slope form:

$y - y_1 = m(x - x_1)$
 $y - 3 = 1(x - 2)$
 $y - 3 = x - 2$

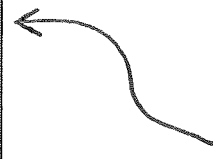
slope y -int. form $\rightarrow \underline{\underline{y = x + 1}}$ OR

General form $\rightarrow \underline{\underline{x - y + 1 = 0}}$

12. Using the table of values, determine the equation of the line. (1 mark)

x	y
-5	-20
0	-5
5	10
10	25
15	40

First find the slope = $m = \frac{-20 - (-5)}{-5 - 0}$
 $= \frac{-15}{-5} = \frac{3}{1} = \underline{\underline{3}}$



This value (-5) is the y -intercept
 so if we use $y = mx + b$

then $\underline{\underline{y = 3x - 5}}$ OR

General Form $\rightarrow \underline{\underline{3x - y - 5 = 0}}$

13. A hockey arena sells game tickets for \$150 each. The hockey team's salaries, arena workers' salaries, and other expenses are fixed at \$45 000 per game, no matter how many tickets are sold. (3 marks)

a) Write a linear equation for the total amount of money, H , earned after expenses if t tickets are sold for a game.

Use $y = mx + b$ form where $H \rightarrow$ same as y ,
and $t \rightarrow$ same as x , and
 $b \rightarrow$ same as 45,000

$$\underline{\underline{H = 150t - 45000}}$$

b) How many tickets have to be sold for a game in order for the arena to earn \$90 000 after expenses?

Substitute \$90 000 for H in previous equation (and solve for t):

$$\begin{array}{r} 90\,000 = 150t - 45\,000 \\ + 45\,000 \qquad \qquad + 45\,000 \\ \hline 135\,000 = 150t \\ \div \quad \quad \quad \div \\ \hline 900 = t \end{array}$$

900 = t, so 900 tickets have to be sold.

c) If the team sells 200 tickets for a game, how much money does the arena earn or lose after expenses?

Use equation from part (a) and substitute 200 for t (# of tickets):

$$H = 150(200) - 45000$$

$$H = 30,000 - 45,000$$

$$\underline{\underline{H = -15,000}} \text{ so } \underline{\underline{\$15,000}} \text{ will be lost}$$

14. Expectation #6: Identify whether two lines are parallel, perpendicular, or neither.

The slopes of a pair of lines are provided. Decide whether the lines are parallel, perpendicular, or neither. Justify your answer. (1 mark)

$m = 10$ and $m = -0.1$ rewrite both values as fractions to compare:
 $\downarrow \qquad \downarrow$
 $\frac{10}{1} \quad -\frac{1}{10} \rightarrow$ Negative reciprocal fractions mean the 2 lines are perpendicular.

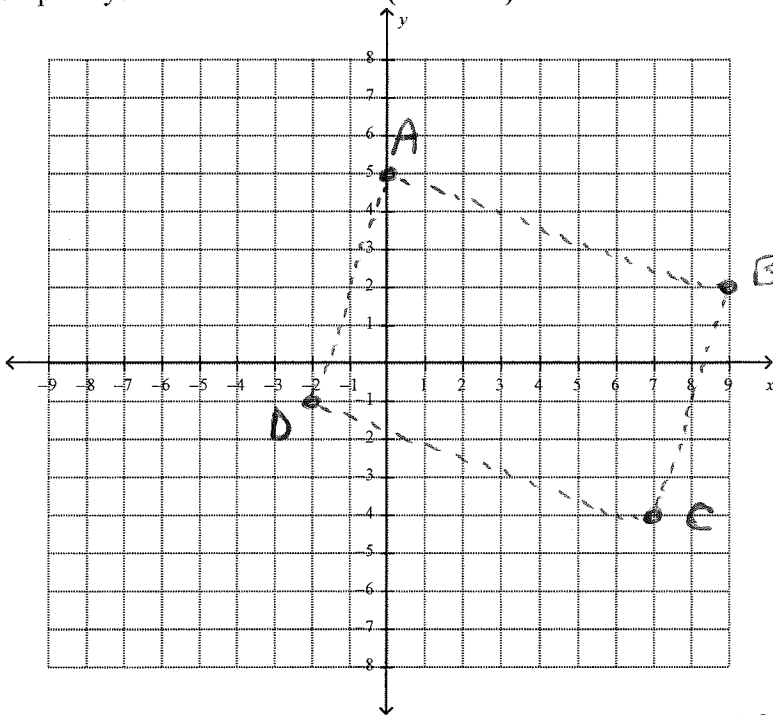
15. What is the slope of a line that is perpendicular to the line passing through points G(-3, 8) and H(0, 5)?

(1 mark) First find the slope of the line passing through these 2 points:

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - 5}{-3 - 0} = \frac{3}{-3} = \underline{\underline{-1}}$$

So, Slope of perp. line = $\underline{\underline{\frac{1}{1}}} = \underline{\underline{1}}$

16. The vertices of quadrilateral ABCD are A(0, 5), B(9, 2), C(7, -4), and D(-2, -1). Is ABCD a rectangle? Explain your method. (2 marks)



Use $m = \frac{y_2 - y_1}{x_2 - x_1}$ to find the slopes of all 4 line segments

$$m \text{ of } \overline{AB} = \frac{5 - 2}{0 - 9} = \frac{3}{-9} = \underline{\underline{-\frac{1}{3}}}$$

$$m \text{ of } \overline{BC} = \frac{-4 - 2}{7 - 9} = \frac{-6}{-2} = \underline{\underline{3}}$$

$$m \text{ of } \overline{CD} = \frac{-1 - (-4)}{-2 - 7} = \frac{3}{-9} = \underline{\underline{-\frac{1}{3}}}$$

$$m \text{ of } \overline{AD} = \frac{-1 - 5}{-2 - 0} = \frac{-6}{-2} = \underline{\underline{3}}$$

Ans.

Yes, ABCD is a rectangle because the slopes of the adjacent line segments are negative reciprocals of each other (i.e. $-\frac{1}{3}$ vs $\frac{3}{1}$)

17. Expectation #7: Write the equation for, and solve problems involving parallel and perpendicular lines.

What is the equation of the line that is perpendicular to the line $y = -3x + 2$ and passes through $(3, -1)$?

(1 mark) Perp. line slope $\equiv m = \frac{1}{3}$; then use Point-slope form:

$$y - y_1 = m(x - x_1)$$

$$y - (-1) = \frac{1}{3}(x - 3)$$

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

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

OR In General Form:

$$\left[y = \frac{x}{3} - 2 \right] \times 3$$

$$3y = x - 6$$

$$0 = x - 3y - 6$$

18. State the slope of the line that is parallel to the line $y = \frac{2}{5}x - 3$ (1 mark)

Parallel lines have the same slope!

$$y = mx + b$$

$$y = \frac{2}{5}x - 3$$

↑
slope

So, slope of parallel line is: $\frac{2}{5}$

19. Write the equation of the line parallel to $y = 2x - 4$ and with the same x-intercept as $3x - 4y = 12$. (1 mark)

$$y = mx + b$$

↓
 $2 =$ slope of parallel line.

① Find the x-intercept of: $3x - 4y = 12$ by setting value of y to zero: $3x - 4(0) = 12$

$$\div \frac{3x}{3} = \frac{12}{3} \div$$

$$x = 4$$

$$x \text{ intercept} = (4, 0)$$

(x, y)

② Use Point-slope form:

$$y - y_1 = m(x - x_1)$$

$$y - 0 = 2(x - 4)$$

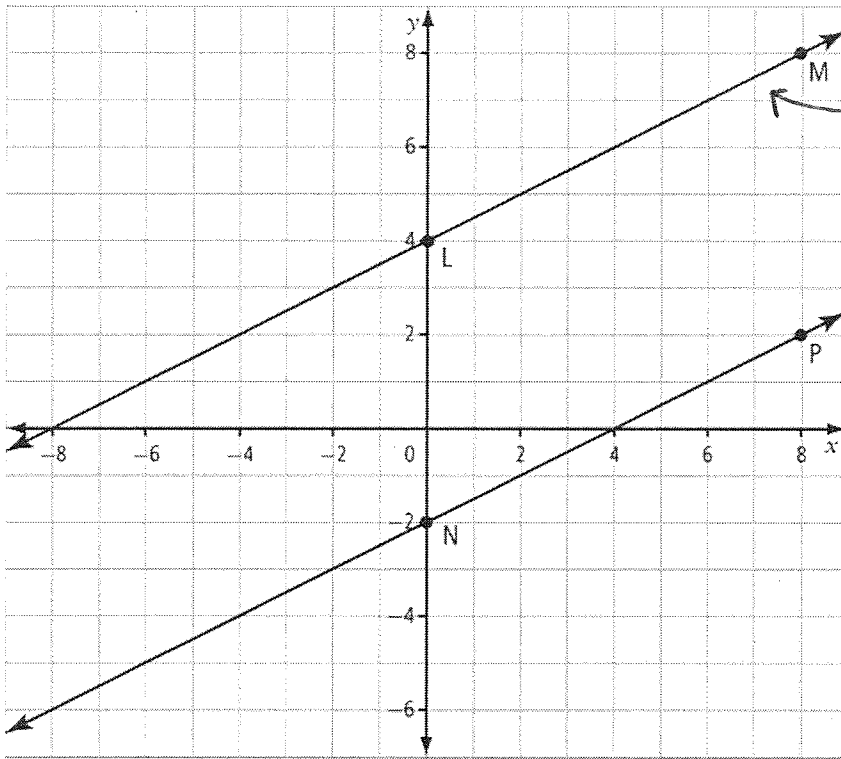
$$y = 2x - 8$$

OR

In General Form:

$$0 = 2x - y - 8$$

20. In the graph, the equation of the line containing LM is $y = 0.5x + 4$. The two lines are parallel. What is the equation of the line containing NP? (1 mark)



$y = 0.5x + 4$
is in the form:
 $y = mx + b$

The two lines are parallel so they must have the same slope (of 0.5).
The only thing different between LM and NP is the y-intercept (4 vs -2).

So, the equation of NP is:

$$\underline{y = \frac{1}{2}x - 2} \quad \text{OR} \quad \underline{y = 0.5x - 2} \quad \text{in the form: } y = mx + b$$

OR In General Form:

$$[y = \frac{1}{2}x - 2] \times 2$$

$$2y = x - 4$$

$$\underline{\underline{0 = x - 2y - 4}}$$