Quiz 2 Solutions

Name and Student Number: _____

Write your solutions to the following exercises in the space provided. *Show all of your work.* Remember to use good notation and full sentences. *Good Luck!*

1. Consider the line $y = -\frac{1}{2}x + 17$.

   (a) Find the y-intercept of this line, or explain why such a value does not exist.   [1 pt]

   Solution: We set $x = 0$ to find $y = -\frac{1}{2}(0) + 17 = 17$.

   (b) Find the x-intercept of this line, or explain why such a value does not exist.   [1 pt]

   Solution: We set $y = 0$ to find $0 = -\frac{1}{2}x + 17 \implies \frac{1}{2}x = 17 \implies x = 2(17) = 34$.

   (c) What is the slope of this line? If it has no slope, then say so.   [1 pt]

   Solution: $m = -\frac{1}{2}$.

   (d) Find the point on this line that has a y-value of 6, or explain why such point does not exist.   [2 pts]

   Solution: We set $y = 6$ to find

   $$6 = -\frac{1}{2}x + 17$$
   $$\frac{1}{2}x = 17 - 6$$
   $$x = 11(2) = 22$$

   Thus, the desired point is $(22, 6)$.

2. Consider the line $x = 12$.

   (a) Find the y-intercept of this line, or explain why such a value does not exist.   [1 pt]

   Solution: There is no y-intercept since the line is a vertical line which does not cross the y-axis.

   (b) Find the x-intercept of this line, or explain why such a value does not exist.   [1 pt]

   Solution: $x = 12$

   (c) What is the slope of this line? If it has no slope, then say so.   [1 pt]

   Solution: The slope is undefined since the line is vertical.

   (d) Find the point on this line that has a y-value of 6, or explain why such point does not exist.   [1 pt]

   Solution: $(12, 6)$

Turn over for Exercises (3)–(6)...

3. Find the slope-intercept form of the line with equation $10y - 2 + 5y = -8x - (-9)$.   [2 pts]

   Solution: We have
   $$15y - 2 = -8x + 9$$
   $$15y = -8x + 9 + 2$$
   $$15y = -8x + 11$$
   $$y = -\frac{8}{15}x + \frac{11}{15}$$

4. Find the slope of the line passing through the points $(1, -3)$ and $(-2, 4)$.   [2 pts]

   Solution: We have
   $$m = \frac{4 - (-3)}{-2 - 1} = \frac{4 + 3}{-2 - 1} = \frac{7}{-3} = -\frac{7}{3}.$$

5. Use the point-slope equation to find an equation of the line through the point $(1, -1)$ and parallel to the line $3x - 2y = 4$.   [3 pts]

   Solution: The desired line has the same slope as the $3x - 2y = 4$. We write the equation $3x - 2y = 4$ in slope-intercept form:
   $$-2y = -3x + 4$$
   $$y = \frac{3}{2}x - 2$$

   Thus, the slope of the desired line is $m = \frac{3}{2}$. The point-slop equation gives an equation of the desired line as follows:
   $$y - (-1)) = \frac{3}{2}(x - 1)$$
   or
   $$y + 1 = \frac{3}{2}(x - 1).$$

6. Use Substitution to find the point of intersection (if any) of the lines $x - 2y = -2$ and $2x - 5y = -10$.   [4 pts]

   Solution: We first re-write the first equation as $x = 2y - 2$. We next substitute this value of x into our second equation:
   $$2(2y - 2) - 5y = -10 \implies 4y - 4 - 5y = -10 \implies -y = -6 \implies y = 6.$$

   Substituting $y = 6$ into the first equation then gives
   $$x - 2(6) = -2 \implies x - 12 = -2 \implies x = -2 + 12 = 10.$$

   Thus, the point of intersection is $(10, 6)$.

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