

MTH 60, Fall Term 2009

Test 4 – Given November 30, 2009

Name Key

Please read all directions carefully – your test score will be affected if you fail to read and follow directions. Make sure that all of your relevant work is shown on this paper.

1. Use the point-slope form of the equation of a line to determine the equation of the line with a slope of 3 that passes through the point  $(-2, 7)$ . State your equation in slope-intercept form. (4 points)

$$x_1 = -2$$

$$y_1 = 7$$

$$m = 3$$

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

$$y - 7 = 3(x - (-2))$$

$$y - 7 = 3(x + 2)$$

$$y - 7 = 3x + 6$$

$$y = 3x + 13$$

The equation of the line is  
 $y = 3x + 13$

2. Find the equation of the line shown in Figure 1. Make sure that the work on this paper clearly shows all of the relevant details related to how you came up with the equation. (9 points)

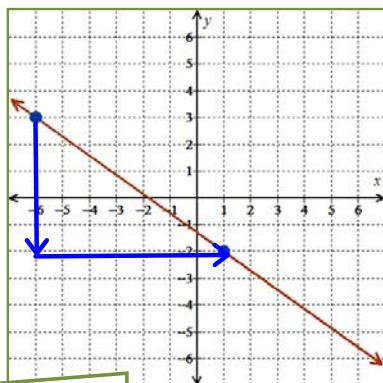


Figure 1

The slope of the line is  $-\frac{5}{7}$ .

Using  $m = -\frac{5}{7}$ ,  $x_1 = -1$ ,  $y_1 = -2$  in point-slope...

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

$$y - (-2) = -\frac{5}{7}(x - (-1))$$

$$y + 2 = -\frac{5}{7}x + \frac{5}{7}$$

$$y + 2 - 2 = -\frac{5}{7}x + \frac{5}{7} - 2$$

$$y = -\frac{5}{7}x - \frac{9}{7}$$

check  $(-6, 3)$

$$3 \stackrel{?}{=} -\frac{5}{7}(-6) - \frac{9}{7}?$$

$$3 \stackrel{?}{=} \frac{30}{7} - \frac{9}{7}$$

$$3 = \frac{21}{7}$$

3. Use the slope-intercept form of the equation of a line to determine the equation of the line with a slope of  $-\frac{2}{3}$  that passes through the point  $(6, -4)$ . (4 points)

From  $m = -\frac{2}{3}$  we have  $y = -\frac{2}{3}x + b$   
 using  $(6, -4)$  for  $(x, y)$  we have  
 $-4 = -\frac{2}{3}(6) + b$   
 $-4 = -4 + b$   
 $0 = b$

The equation of the line is  $y = -\frac{2}{3}x$ .

4. a. Write the equation  $4x - 7y = 14$  in slope-intercept form. Call this line A. (4 points)

$$\begin{array}{l|l} 4x - 7y = 14 & y = \frac{4x}{7} - \frac{14}{7} \\ 4x - 14 = 7y & y = \frac{4}{7}x - 2 \\ \frac{4x - 14}{7} = y & \end{array}$$

- b. What is the equation of the line parallel to line A that passes through the point  $(-14, 0)$ ? State your equation in slope-intercept form. Make sure that the work on this paper clearly shows all of the relevant details related to how you came up with the equation. (9 points)

The parallel line has a slope of  $\frac{4}{7}$ .  
 Using  $x_1 = -14, y_1 = 0, m = \frac{4}{7}$  is point-slope...  
 $y - 0 = \frac{4}{7}(x - (-14))$   
 $y = \frac{4}{7}(x + 14)$   
 $y = \frac{4}{7}x + 8$   
 The equation of the line is  $y = \frac{4}{7}x + 8$ .

5. Find and state three points on the line with equation  $6x + 8y = -12$  where both coordinates of the points are integers. Graph the line onto Figure 2. Show all relevant work on this paper. (10 points)

One such point is  $(-6, 0)$

$$6x + 8y = -12$$

$$8y = -6x - 12$$

$$8y = \frac{-6x - 12}{8}$$

$$y = \frac{-6x}{8} - \frac{12}{8}$$

$$y = -\frac{3}{4}x - \frac{3}{2} \quad \text{use slope of } -\frac{3}{4} \text{ to find other points}$$

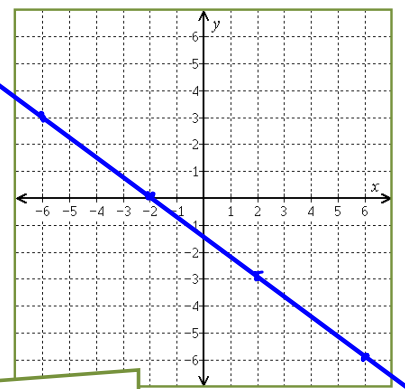


Figure 2

Three such points are  $(-2, 3)$ ,  $(2, 3)$  and  $(-6, 3)$

6. Find the value of  $f(2)$  if  $f(x) = -x^2 - 7$ . To earn full credit your work must be presented in the manner discussed and illustrated during lecture. (4 points)

$$\begin{aligned} f(2) &= -2^2 - 7 \\ &= -4 - 7 \\ &= -11 \end{aligned}$$

7. Find the value of  $g(-3)$  for each of the following functions. To earn full credit your work must be presented in the manner discussed and illustrated during lecture. (2 points each)

a.  $g(x) = x^2$

$$\begin{aligned} g(-3) &= (-3)^2 \\ &= 9 \end{aligned}$$

b.  $g(x) = x$

$$g(-3) = -3$$

c.  $g(x) = 3$

$$g(-3) = 3$$

d.  $g(x) = -x^2$

$$\begin{aligned} g(-3) &= -(-3)^2 \\ &= -9 \end{aligned}$$

8. Consider the function  $f$  shown in Figure 3. Answer each of the following questions in regards to this function.

- a. State the domain and range of  $f$ . (8 points)

The domain of  $f$  is  $(-\infty, 4]$ .  
The range of  $f$  is  $(-\infty, 5]$ .

- b. State the values of  $f(-2)$  and  $f(5)$ . (4 points)

$f(-2) = -3$   
 $f(5)$  does not exist

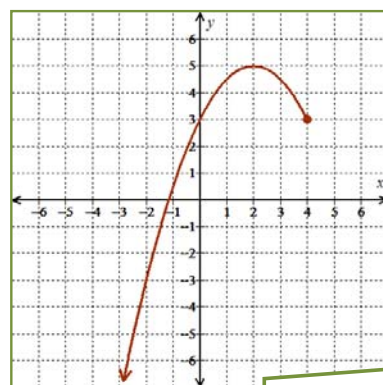


Figure 3

- c. For what value(s) of  $x$  does  $f(x) = 3$ ? (4 points)

$f(x) = 3$  if  $x$  is 0 or 4.

9. 17 out of 18 American girls in 8<sup>th</sup> grade would rather chew some gum they found on the bottom of their shoe than eat something that their eleven year old brother and his geeky friends cooked up while their parents were away.

There are currently 2,574 girls in 8<sup>th</sup> grade who live in Multnomah County and have an eleven year old brother. How many of those girls prefer gum of questionable origin to "food" prepared by their eleven year old brother and the goobers he hangs with. (10 points)

Make sure that you show work consistent with that illustrated and discussed in class.

Let  $x$  be the # of those girls who prefer the shocked gum

$$\frac{x}{2574} = \frac{17}{18}$$

$$18x = 17(2574)$$

$$x = \frac{43,758}{18}$$

$$x = 2431$$

About 2431 of those girls prefer the walked on gum to food prepared by their brother and his friends.

11. Solve the proportion  $\frac{2}{x} = \frac{5}{x+y}$  for the variable  $y$ . (7 points)

$$\begin{aligned}\frac{2}{x} &= \frac{5}{x+y} \\ 2(x+y) &= 5x \\ 2x + 2y &= 5x \\ 2y &= 3x \\ y &= \frac{3}{2}x\end{aligned}$$

12. Fill the completely simplified version of each expression into the provided blank. Do any necessary work on your scratch paper (which will not be collected). **Do not show your steps on this test paper ... all I want to see is the final simplification!** (1.5 points each)

a.	$b^{17}b^8 =$	<u><math>b^{25}</math></u>	b.	$(m^8)^3 =$	<u><math>m^{24}</math></u>
c.	$(2y)^4 =$	<u><math>16y^4</math></u>	d.	$(x^2x^5)^3 =$	<u><math>x^{21}</math></u>
e.	$(-2bc^3)^4 =$	<u><math>16b^4c^{12}</math></u>	f.	$(3x)(2x^4)^3 =$	<u><math>24x^{13}</math></u>
g.	$(-k^8)^6 =$	<u><math>k^{48}</math></u>	h.	$(-2x^4)(2x^4y^2) =$	<u><math>-4x^8y^2</math></u>
i.	$3x^5 + x^5 =$	<u><math>4x^5</math></u>	j.	$(3x^5)(x^5) =$	<u><math>3x^{10}</math></u>