

MTH 60, Fall Term 2007  
Final Exam – Given December 12, 2007  
No Calculator Portion

Name

Key

Please read all directions carefully – your test score will be probably decrease if you fail to read and follow directions.

1. Find each value and write the value into the provided blank - do all figuring on scratch paper.

a.  $7 - (-5)$

a. 12

b.  $11 + (-5)$

b. 6

c.  $-6 - (-19)$

c. 13

d.  $-7 - 28$

d. -35

e.  $3 - 9 \cdot 2$

e. -15

f.  $5 \cdot (-2)^2$

f. 20

g.  $-3^2 + 1$

g. -8

h. the value of  $2\left(1 + \frac{1+x}{2}\right)$  when  $x=3$

h. 6

i. the value of  $x + |x|$  when  $x=-4$

i. 0

j. the value of  $|x + x|$  when  $x=-4$

j. 8

k. 30 take away 20% of 30

k. 24

2. Consider the line with equation  $y = -2x + 3$ .

- a. What is the slope of this line?

$$-2$$

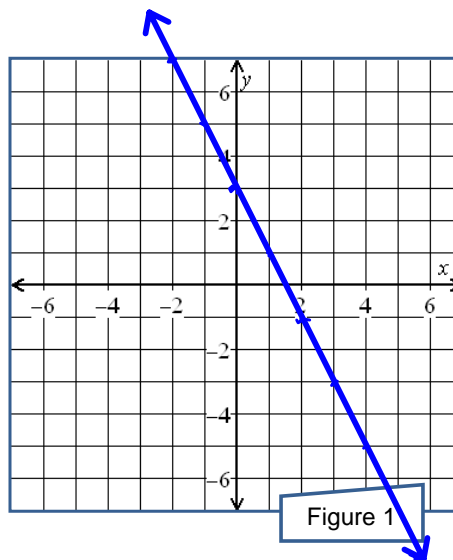
- b. What is the y-intercept of this line?

$$(0, 3)$$

- c. What is the x-intercept of this line?

$$(3/2, 0)$$

- d. Graph the line onto Figure 1.



3. Consider the line with equation  $3x + 5y = 11$ .

- a. State a point on the line where both coordinates are integers - do your figuring on scratch paper.

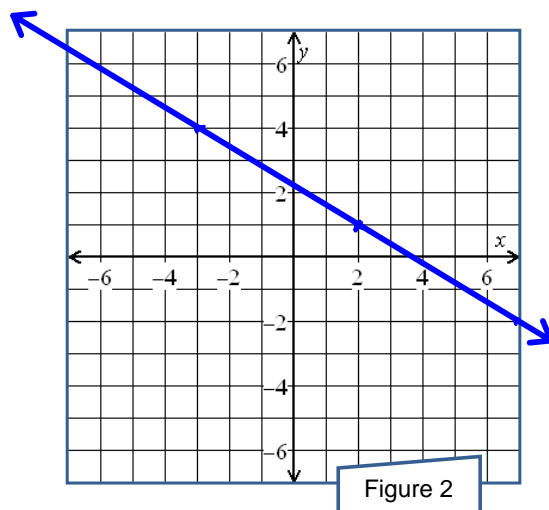
$$\begin{array}{c|c} x & y \\ \hline 2 & 1 \\ \hline 7 & -2 \end{array}$$

$$\begin{array}{c|c} x & y \\ \hline -3 & 4 \\ \hline -8 & 7 \end{array}$$

- b. Write the equation of the line in slope-intercept form - show all work.

$$\begin{aligned} 3x + 5y &= 11 \\ 3x + 5y - 3x &= 11 - 3x \\ 5y &= 11 - 3x \\ \frac{5y}{5} &= \frac{11 - 3x}{5} \\ y &= -\frac{3}{5}x + \frac{11}{5} \end{aligned}$$

- c. Graph the line onto Figure 2.



Key

Please read all directions carefully – your test score will be probably decrease if you fail to read and follow directions.

1. Find the equation of the line that passes through the points  $(6, 7)$  and  $(2, -5)$ . Make sure that you show all work in a well documented manner. Make sure that you state a conclusion using a complete sentence.

$$M = \frac{-5-7}{2-6}$$

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

$$= 3$$

using point-slope we have  $(m=3, x_1=6, y_1=7)$

$$y-7 = 3(x-6)$$

$$y-7 = 3x-18$$

$$y = 3x-11$$

The equation of the line is  $y = 3x - 11$

2. Use the formula  $V = lwh$  to find the volume of a box whose length, width, and height are, respectively, 7.1 ft, 4.4 ft, and 3.9 ft. **Include units while making your calculation.** State your conclusion using a complete sentence.

$$V = (7.1 \text{ ft})(4.4 \text{ ft})(3.9 \text{ ft})$$

$$= 121.836 \text{ ft}^3$$

The volume of the box is  $121.836 \text{ ft}^3$

3. Find the solution to each equation. Show relevant work. State your conclusions using complete sentences.

a.  $5x - 15 = 8x - 12$ .

$$\begin{aligned} 5x - 15 &= 8x - 12 \\ 5x - 15 - 5x &= 8x - 12 - 5x \\ -15 &= 3x - 12 \\ -15 + 12 &= 3x - 12 + 12 \\ -3 &= 3x \\ \frac{-3}{3} &= \frac{3x}{3} \end{aligned}$$

$$-1 = x$$

The solution to  $5x - 15 = 8x - 12$  is  $-1$ .

$$(-20 = -20 \checkmark)$$

b.  $6 + 2(1 + 2t) = -(2 - 4t)$

$$6 + 2(1 + 2t) = -(2 - 4t)$$

$$6 + 2 + 4t = -2 + 4t$$

$$8 + 4t = -2 + 4t$$

$$8 + 4t - 4t = -2 + 4t - 4t$$

$$8 = -2 \leftarrow \text{contradiction!}$$

The equation  $6 + 2(1 + 2t) = -(2 - 4t)$  has no solutions.

c.  $1 + 5x + 3(2 + x) = 4x - 3 + 10(1 + 2x)$

$$1 + 5x + 3(2 + x) = 4x - 3 + 10(1 + 2x)$$

$$1 + 5x + 6 + 3x = 4x - 3 + 10 + 20x$$

$$8x + 7 = 24x + 7$$

$$8x + 7 - 7 = 24x + 7 - 7$$

$$8x = 24x$$

$$8x - 8x = 24x - 8x$$

$$0 = 16x$$

$$\frac{0}{16} = \frac{16x}{16}$$

$$0 = x$$

The solution to  $1 + 5x + 3(2 + x) = 4x - 3 + 10(1 + 2x)$  is  $0$ .

$$\left[ \begin{aligned} 1 + 3(2) &= 0 - 3 + 10(1) ? \\ 7 &= 7 \checkmark \end{aligned} \right]$$

4. Solve the formula  $F = \frac{9}{5}C + 32$  for the variable  $C$ . Show all relevant work.

$$\begin{aligned} F &= \frac{9}{5}C + 32 \\ 5 \cdot F &= 5 \cdot \left( \frac{9}{5}C + 32 \right) \\ 5F &= 9C + 160 \\ 5F - 160 &= 9C \\ C &= \frac{5F - 160}{9} \end{aligned}$$

5. Find the solution set to each inequality. State each solution set using *interval notation*.

- a. Find the solution set to the inequality  $2 < 4t + 6 \leq 14$ .

$$\begin{aligned} 2 &< 4t + 6 \leq 14 \\ 2 - 6 &< 4t + 6 - 6 \leq 14 - 6 \\ -4 &< 4t \leq 8 \\ \frac{-4}{4} &< \frac{4t}{4} \leq \frac{8}{4} \\ -1 &< t \leq 2 \end{aligned}$$

The solution set  
to  $2 < 4t + 6 \leq 14$   
is  $(-1, 2]$ .

- b. Find the solution set to the inequality  $3x - 6 \geq 8x + 2$ .

$$\begin{aligned} 3x - 6 &\geq 8x + 2 \\ 3x - 6 - 8x &\geq 8x + 2 - 8x \\ -5x - 6 &\geq 2 \\ -5x - 6 + 6 &\geq 2 + 6 \\ -5x &\geq 8 \\ \frac{-5x}{-5} &\leq \frac{8}{-5} \end{aligned}$$

$x \leq -\frac{8}{5}$   
The solution set for  
 $3x - 6 \geq 8x + 2$  is  
 $(-\infty, -\frac{8}{5}]$ .

6. Consider the line shown in Figure 1.

a. State the slope-intercept equation for the line.

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

b. What is the slope of a line that is perpendicular to the line already drawn in Figure 1?

$$\frac{2}{3}$$

7. Graph onto Figure 2 the solution set to the inequality  $x - 2y > 3$ .

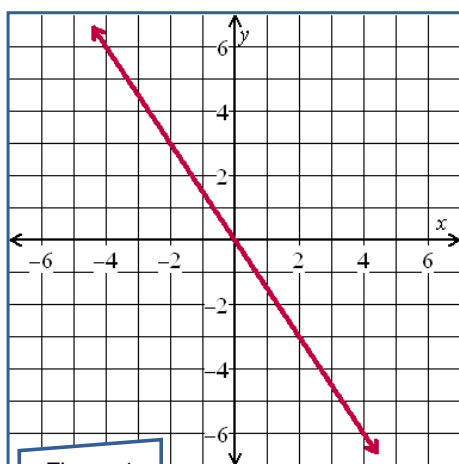


Figure 1

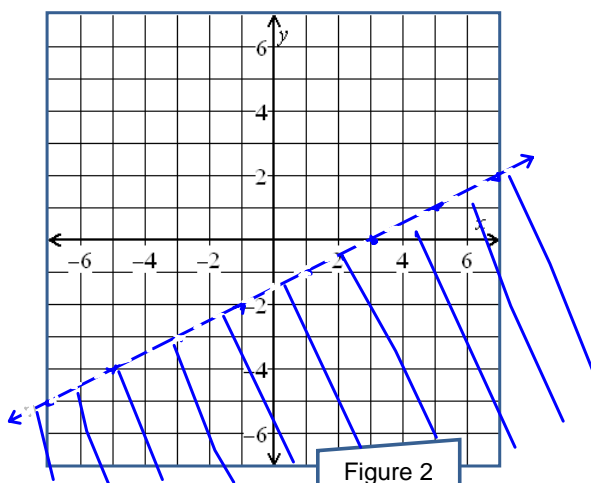


Figure 2

8. The total number of times Elmer Fudd shot at but missed Bugs Bunny in 1968 was 32% greater than the number of times he shot and missed in 1967. In 1968, Elmer shot and missed Bugs a total of 429 times. How many times did Elmer shoot at but miss that wascally wabbit in 1967? To earn full credit, you need to define a variable and write an equation that models this situation. State your conclusion using a complete sentence.

Let  $x$  be the number of times Mr. Fudd shot and missed in 1967

$$x + .32x = 429$$

$$1.32x = 429$$

$$x = \frac{429}{1.32} = 325$$

Elmer shot at but missed the wabbit 325 times in 1967



Figure Fudd

9. Ermani had a collection of dimes and quarters. All told, Ermani had 600 coins in her collection. The total face value of the coins was \$118.35. How many of each type of coin did Ermani have in her collection? To earn full credit, you need to define a variable and write an equation that models this situation. State your conclusion using a complete sentence.

Let  $x$  be the number of dimes in Ermani's collection. Then she has  $600 - x$  quarters.

$$10x + .25(600 - x) = 118.35$$

$$.10x + 150 - .25x = 118.35$$

$$-.15x = 118.35 - 150$$

$$-.15x = -31.65$$

$$x = \frac{-31.65}{-.15} = 211 \quad [\text{so } 600 - x = 389]$$

Ermani had 211 dimes and 389 quarters in her collection.

Check

$$.10(211) = 21.10$$

$$.25(389) = 97.25$$

$$21.10 + 97.25 = 118.35$$

10. What is the equation of the vertical line that passes through the point  $(3, 8)$ ?

$$x = 3$$

11. What is the equation of the line with undefined slope that passes through the point  $(-2, 7)$ ?

$$x = -2$$

12. Write down an equation that illustrates the commutative property of multiplication.

$$xy = yx$$

13. Write down an equation that illustrates the associative property of addition.

$$(a + b) + c = a + (b + c)$$

14. Lots of people who visit New York City like to take carriage rides through Central Park. The horseman who operates one such carriage charges by the half-hour. The cost of renting this carriage is shown in Figure 3. If we connected the dots on this graph, what, *including unit*, would the slope of the resultant line be?

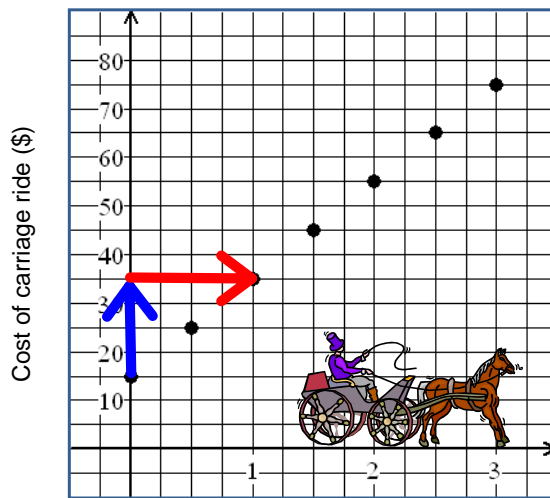


Figure 3

Time spent in carriage (hr)

$$\begin{aligned}
 m &= \frac{\text{rise}}{\text{run}} \\
 &= \frac{\$20}{1 \text{ hr}} \\
 &= 20 \text{ \$/hr}
 \end{aligned}$$

15. Please, oh pretty please, go back and check all of your answers ... really *check* the ones that you can. ☺