

MTH 60, Fall Term 2009  
 Final Exam – No Calculator Portion  
 Given December 9, 2009

Name Key

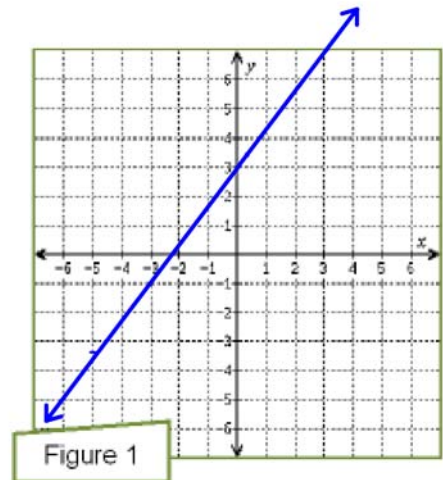
Please read all directions carefully – your test score will be probably decrease if you fail to read and follow directions.

1. Consider the line with equation  $4x - 3y = -9$ .
  - a. State the slope and y-intercept of the line after first writing the equation of the line in slope-intercept form. (7 points)
  - b. Carefully graph the line on Figure 1. (4 points)

$$\begin{aligned}
 4x - 3y &= -9 \\
 -3y &= -4x - 9 \\
 \frac{-3y}{-3} &= \frac{-4x - 9}{-3}
 \end{aligned}$$

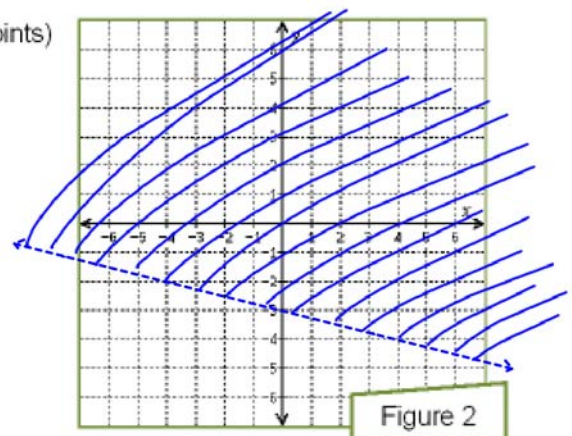
$$\begin{aligned}
 y &= \frac{4}{3}x + 3 \\
 \text{The slope is } \frac{4}{3}.
 \end{aligned}$$

$$\text{The y-intercept is } (0, 3)$$



2. Graph the solution to  $x + 4y > -12$  on Figure 2. (5 points)

$$\begin{aligned}
 x + 4y &> -12 \\
 4y &> -x - 12 \\
 y &> -\frac{1}{4}x - 3
 \end{aligned}$$



3. Solve each equation and state the solution using a complete sentence. (7 points each)

a.  $7(2-x) = 5(x-1)$

$$\begin{aligned} 7(2-x) &= 5(x-1) \\ 14 - 7x &= 5x - 5 \end{aligned}$$

$$-12x = -19$$

$$x = 19/12$$

The solution is  $19/12$ .

b.  $3(2x+1) = 2(4+3x)$

$$3(2x+1) = 2(4+3x)$$

$$6x + 3 = 8 + 6x$$

$$0 = 5 \text{ Dude!}$$

There is no solution to the equation.

4. Solve  $S = 4lw + 2wh$  for  $h$ . (5 points)

$$S = 4lw + 2wh$$

$$S - 4lw = 2wh$$

$$h = \frac{S - 4lw}{2w}$$

5. Is  $\left(\frac{2}{3}, -\frac{1}{9}\right)$  a solution to  $y = -\frac{2}{3}x + \frac{1}{3}$ ? Show the work that justifies your answer.  
(4 points)

$$-\frac{1}{9} \stackrel{?}{=} -\frac{2}{3}\left(\frac{2}{3}\right) + \frac{1}{3}$$

$$-\frac{1}{9} \stackrel{?}{=} -\frac{4}{9} + \frac{1}{3}$$

$$-\frac{1}{9} = -\frac{4}{9} + \frac{3}{9} \quad \left(\frac{2}{3}, -\frac{1}{9}\right) \text{ is a solution}$$

$$-\frac{1}{9} \stackrel{?}{=} -\frac{1}{9}$$

yes!

6. Completely simplify  $5 - 2(t - 2) + \frac{1}{3}t$ . Make sure that your work is presented in the manner we discussed in class. (5 points)

$$\begin{aligned} 5 - 2(t - 2) + \frac{1}{3}t &= 5 - 2t + 4 + \frac{1}{3}t \\ &= -\frac{6}{3}t + \frac{1}{3}t + 9 \\ &= -\frac{5}{3}t + 9 \end{aligned}$$

7. Write the requested bit of information in each provided box.; do any necessary figuring on your scratch paper (which will not be collected or graded). (2 points each)

a.	What is the slope of the line with equation $x = -\frac{1}{3}$ ?	undefined!
b.	What is the $x$ -intercept of the line with equation $x + 2y = -6$ ?	$(-6, 0)$
c.	What is the slope of a line perpendicular to the line with equation $y = \frac{3}{4}x - 6$ ?	$-\frac{4}{3}$
c.	Completely simplify $(m^6)^7$ and write the result in the box.	$m^{42}$
d.	Completely simplify $x^{32}x^{41}$ and write the result in the box.	$x^{73}$
e.	Completely simplify $-2^2x^4$ and write the result in the box.	$-4x^4$
f.	Completely simplify $(-2x^4)^2$ and write the result in the box.	$4x^8$
g.	What is the value of $f(-1)$ if $f(x) = x^2$ ?	1
h.	What is the value of $f(7)$ if $f(x) = 29$ ?	29
i.	What property is illustrated by the equation $3 + (4 + 5) = (3 + 4) + 5$ ?	associative property of addition
j.	Which line is steeper, the line with equation $y = 2x - 5$ or the line with equation $y = -3x + 2$ ?	$y = -3x + 2$

MTH 60, Fall Term 2009  
 Final Exam – Calculator Portion  
 Given December 9, 2009

Name 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 a line that passes through the points  $(-2, -6)$  and  $(-3, 9)$ ; state the equation in slope-intercept form (9 points)

$$\begin{aligned} m &= \frac{9 - (-6)}{-3 - (-2)} \\ &= \frac{15}{-1} \\ &= -15 \\ y - (-6) &= -15(x - (-2)) \\ y + 6 &= -15x - 30 \\ y &= -15x - 36 \end{aligned}$$

The equation of  
 the line is  
 $y = -15x - 36$

2. Find the area of the triangle shown in Figure 1. Assume that the linear units for the graph are cm. Include units *while making your calculation and in your conclusion*. The area formula for a triangle is  $A = \frac{1}{2}bh$ . (6 points)

$$\begin{aligned} h &= 7 \text{ cm} \\ b &= 7 \text{ cm} \\ A &= \frac{1}{2}(7 \text{ cm})(7 \text{ cm}) \\ &= 24.5 \text{ cm}^2 \\ \text{The area is } 24.5 \text{ cm}^2. \end{aligned}$$

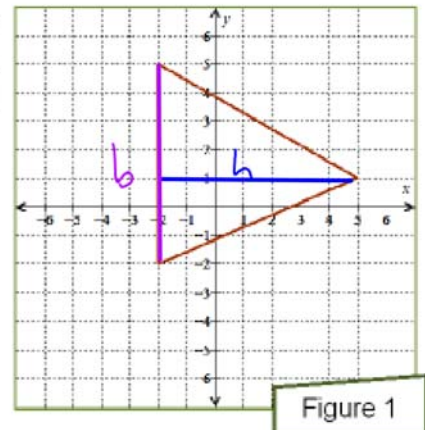
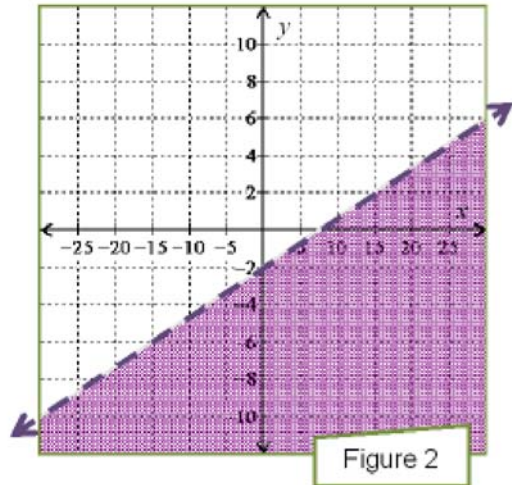


Figure 1

3. Find and state an inequality whose solution set would be the graph shown in Figure 2. (5 points)

$$y < \frac{4}{15}x - 2$$



4. Solve the equation  $\frac{x}{3} - \frac{3}{2} = \frac{x}{4} + \frac{1}{4}$  and state the solution using a complete sentence. (6 points)

$$\begin{aligned} \frac{x}{3} - \frac{3}{2} &= \frac{x}{4} + \frac{1}{4} \\ 12 \left( \frac{x}{3} - \frac{3}{2} \right) &= 12 \left( \frac{x}{4} + \frac{1}{4} \right) \\ 4x - 18 &= 3x + 3 \\ x &= 21 \\ \text{The solution is } 21. \end{aligned}$$

$$\begin{aligned} 7 - \frac{3}{2} &\stackrel{?}{=} \frac{21}{4} + \frac{1}{4} \\ \frac{11}{2} &\stackrel{?}{=} \frac{22}{4} \end{aligned}$$

5. Solve the equation  $\frac{PV}{T} = \frac{k}{2}$  for  $T$ . (5 points)

$$\begin{aligned} \frac{PV}{T} &= \frac{k}{2} \\ 2PV &= kT \\ T &= \frac{2PV}{k} \end{aligned}$$



6. After several years of gaining weight, a math instructor named Dewius Bellius began going to the gym in early 2008. Since early 2008, Dewius' weight has decreased by 20%. If Dewius' current weight is 186 lb., what was his weight when he first started going to the gym?  
(5 points)

Let  $x$  be Dewius' original weight

$$186 = x - .2x$$

$$186 = .8x$$

$$x = \frac{186}{.8}$$

$$= 232.5$$

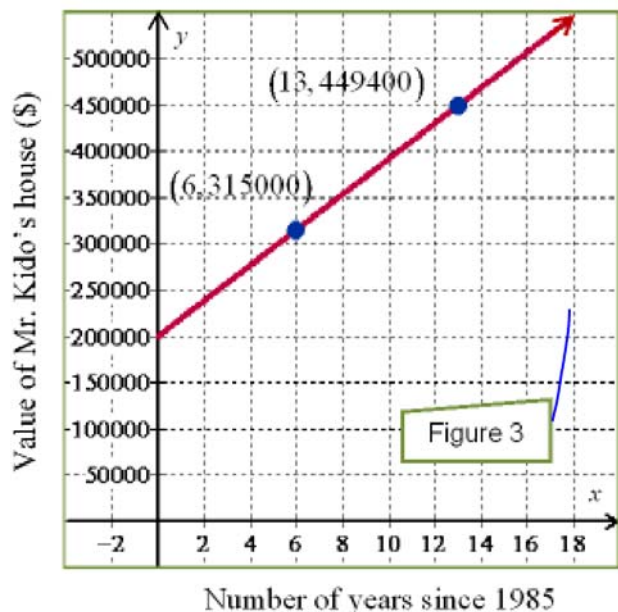
Dewius' weight before going to the gym was 232.5 lb.

7. Mr. Kido purchased a house in 1985. Six years later the value of the house was \$315,000. Thirteen years after it was first purchased, the house was worth \$449,400. A graph of the value of Mr. Kido's house is shown in Figure 3.

Find the slope of this line. Make sure that you include the units when finding the slope!  
(5 points)

$$m = \frac{\$134,400}{7 \text{ years}}$$

$$= 19,200 \$/\text{year}$$



8. Consider the function  $f$  shown in Figure 4. Answer each of the following questions in regards to this function.

- a. State the domain and range of  $f$  using interval notation. (6 points)

The domain is  $(-4, \infty)$ .  
The range is  $(-\infty, 3]$ .

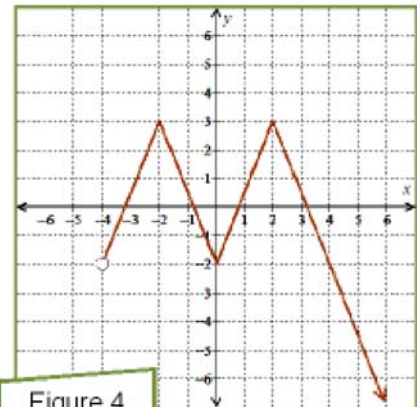


Figure 4

- b. State the values of  $f(-2)$  and  $f(5)$ . (3 points)

$$f(-2) = 3$$

$$f(5) = -4.5$$

- c. For what value(s) of  $x$  does  $f(x) = -2$ ? (3 points)

$$f(x) = -2 \quad \text{when } x \text{ is } 0 \text{ or } 4.$$

9. Solve  $2 - 6x < 17 - 3x$ . State the solution set using set builder notation. (8 points)

$$2 - 6x < 17 - 3x$$

$$-3x < 15$$

$$x > -5$$

The solution set is  $\{x \mid x > -5\}$ .