

Math 100

Midterm

Name \_\_\_\_\_ Section \_\_\_\_\_ Date \_\_\_\_\_ Score \_\_\_\_\_

Show Work!

1. Use order of operations to simplify.

$$\frac{4[-3+(6)^2 \div 2]}{6-2(3-6)} = \frac{4[-3+36 \div 2]}{6-2(-3)}$$

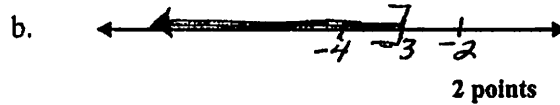
$$= \frac{4[-3+18]}{6+6} = \frac{4[15]}{12} = \frac{60}{12} = 5$$

5  
4 points

2. Write the set using (a) interval notation and (b) graph.

$$\{x | x \leq -3\}$$

a.  $(-\infty, -3]$   
2 points



3. Identify the property that justifies the statements?

- A. Identity property      B. Associative property      C. Commutative property  
D. Distributive property      E. Multiplication Property of Zero

a.  $6(5 + x) = 6(x + 5)$

a. C  
2 points

b.  $-4 + 0 = -4$

b. A  
2 points

4. Solve the equation.

$$\frac{3x-1}{2} = \frac{x+2}{5} + 3$$

$$10\left[\frac{3x-1}{2}\right] = 10\left[\frac{x+2}{5}\right] + 10(3)$$

$$5(3x-1) = 2(x+2) + 30 \Rightarrow 15x - 5 = 2x + 4 + 30$$

$$13x = 39$$

$$x = 3$$

23  
4 points

5. a.) Solve the equation and give the solution set. b.) Identify the equation as a conditional, an identity, or a contradiction.

$$4x - 3(5 - 2x) = 6(x - 3) + 2x + 1$$

$$4x - 15 + 6x = 6x - 18 + 2x + 1$$

$$10x - 15 = 8x - 17$$

$$2x = -2$$

$$x = -1$$

a.  $\{-1\}$   
3 points  
b. Conditional  
2 points

6. Solve the formula.

$$B = cx + a \text{ for } c.$$

$$B - a = cx$$

$$\frac{B - a}{x} = c$$

$$c = \frac{B - a}{x}$$

3 points

7. To make a profit, a baker's sales of cookies must be greater than her costs to make them. The baker sells cookies at a price of \$2 that cost her \$1.50 to make. She also has basic costs of \$5 on each batch of cookies. How many cookies must she sell in a batch in order to make a profit. Write an inequality and solve.

Sales > Cost       $x = \text{number of cookies}$       more than 10

5 points

$$2x > 1.50x + 5$$

$$.50x > 5$$

$$x > \frac{5}{.50}$$

$$x > 10$$

8. a. Solve the inequality. Give the solution set in  
b. interval and c. graph forms. (3 points)

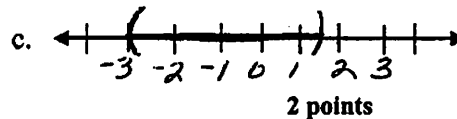
$$-5 < 2x + 1 < 4$$

$$-6 < 2x < 3$$

$$-3 < x < \frac{3}{2}$$

b.  $(-3, \frac{3}{2})$

2 points



9. For the compound inequality, a. solve and give the solution set in

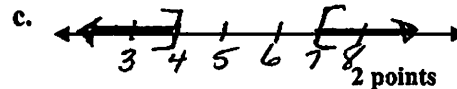
b. interval form and c. graph form. (3 points) b.  $(-\infty, 4] \cup [7, \infty)$

2 points

$$3 + 2x \leq 11 \text{ or } x - 4 \geq 3$$

$$2x \leq 8 \quad x \geq 7$$

$$x \leq 4$$



10. Let  $A = \{0, 2\}$ ,  $B = \{1, 2, 3, 4\}$  and  $C = \{3, 4\}$ .

a. Find.  $B \cup C$

a.  $\{1, 2, 3, 4\}$

2 points

b. Find.  $A \cap C$

b.  $\emptyset$  or  $\phi$

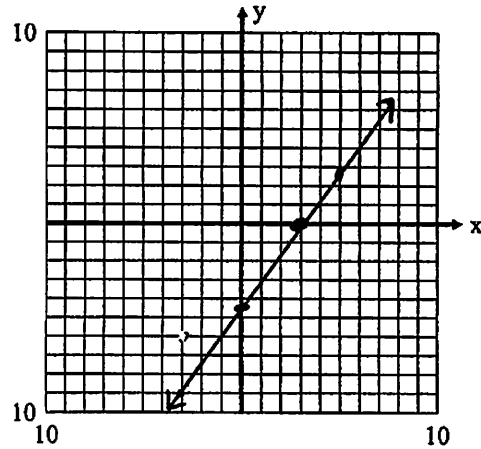
2 points

11. a. Complete the table of ordered pairs for the equation  $3x - 2y = 9$ .

x	y
3	0
0	- <del>3</del> <sup>4.5</sup>
-3	- <del>9</del> <sup>-1.5</sup>
5	3

4 points

b. Graph the equation. (4 points)



12. If two points are on the same horizontal line, they have the same 2y coordinate.  
2 points

13. a. Find the slope of the line  $2x + 3y = 15$ .

$$3y = -2x + 15$$

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

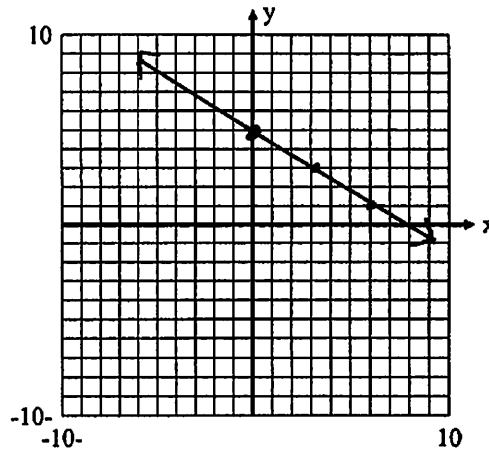
slope:  $-\frac{2}{3}$   
2 points

b. Find the y-intercept.

y-intercept: (0, 5)  
2 points

c. Graph the equation.

(4 points)



14. Find an equation in standard form of the line through the points  $(-1, 5)$  and  $(2, 2)$ .

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{2 - 5}{2 - (-1)} = \frac{-3}{3} = -1$$

$$y - 5 = -1(x + 1)$$

$$y - 5 = -x - 1$$

$$x + y = 4$$

$$x + y = 4$$

5 points

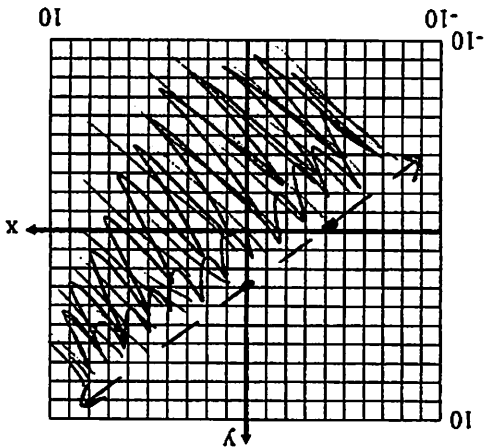
15. Write the equation of the line perpendicular to  $y = 4$ , through  $(2, 5)$ .

$$x = 2$$

4 points

16. Graph the inequality  $3x - 4y > -12$ .

(5 points)



17. a. Explain why or why not that the relation is a function. Give b. the domain and c. the range.

$$R = \{(3, 2), (5, 5), (-6, 2), (2, 5)\}$$

a. It is a function because for each domain value there is exactly one corresponding range value.

b. Domain:  $\{-6, 2, 3, 5\}$

c. Range:  $\{2, 5\}$

18. For  $f(x) = 3 - 4x$ , find :

a.  $f(-2) = 3 - 4(-2) = 3 + 8 = 11$

$$\frac{11}{2 \text{ points}}$$

b.  $f(3b) = 3 - 4(3b) = 3 - 12b$

$$\frac{3 - 12b}{2 \text{ points}}$$

c.  $f(x-1) = 3 - 4(x-1) = 3 - 4x + 4 = 7 - 4x$

$$\frac{7 - 4x}{2 \text{ points}}$$

19. Solve the system by **substitution** or **elimination** and write the solution in the form  $(x, y)$ .

$$\begin{array}{r} 2x + 3y = -8 \\ x - 2y = -4 \\ \hline 2x + 3y = -8 \\ -2x + 4y = 8 \\ \hline 7y = 0 \\ y = 0 \end{array}$$

$$\begin{array}{l} x - 2(0) = -4 \\ x = -4 \\ (-4, 0) \end{array}$$

$$\frac{\{(-4, 0)\}}{5 \text{ points}}$$

20. Select variables to represent the two unknowns, write two equations using the two variables, and solve the resulting system.

A woman wishes to invest \$8000 in two accounts. One account earns 4% interest and the other earns 7.5% interest. The interest for the first year needs to be \$425. How much should she invest in each account?

$x =$  amount at 4% interest  
 $y =$  amount at 7.5% interest

$$x + y = 8000$$

$$.04x + .075y = 425$$

$$-4x - 4y = -32000$$

$$4x + 7.5y = 42500$$

$$3.5y = 10500$$

$$y = \frac{10500}{3.5}$$

$$y = 3000$$

$$x = 8000 - 3000 = 5000$$

\$5000 @ 4%

\$3000 @ 7.5%

5 points