

Math 840 Midterm

Version 4 - Practice

Course Learning Objectives:

- 1) Translate words into algebraic expressions, equations, and inequalities.
- 2) Identify and use the properties of real numbers and classify numbers into appropriate subsets.
- 3) Simplify numerical expressions.
- 4) Solve: linear and literal equations and linear inequalities.
- 5) Solve applications using the equations and inequalities from Objective 4.
- 6) Identify and use connections between linear equations, their slope, their intercepts, and their graphs.
- 7) Identify functions and their domains and ranges; Evaluate functions using proper notation.

Covers Sections 1.2-1.8, 2.1-2.8, 3.3-3.6, 8.1 from the textbook.

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Name _____

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Directions: You must show all work except on multiple choice questions.

I. **MULTIPLE CHOICE** Circle to most correct response. (2 points each)

1. Which of the following is an example of a real number which is a rational number?

- a. 3.14 b. $\sqrt{25}$ c. $\frac{22}{7}$ d. -2 e. all of these

2. Name the property which justifies the following: $x(yz) = (xy)z$

- a. Associative property of multiplication b. Associative property of addition
 c. Commutative property of multiplication d. Commutative property of addition
 e. none of these

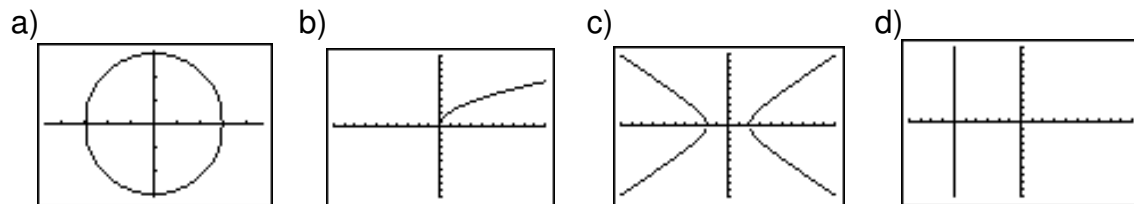
3. Solve for x : $2x - (7 - 4x) = 6x - 6$

- a. $-4 = -4$ b. All real numbers c. no solution d. 0 e. none of these

4. Let g be the function $g = \{(2, 5), (3, 4), (4, 6), (5, 4), (6, 7)\}$. Then $g(6) =$

- a) 4 b) 5 c) 7 d) $g(6)$ is undefined e) $\{2, 3, 4, 5, 6\}$

5. Which of the following is the graph of a function:

6. Let g be the function $g = \{(-2, 2), (-1, 1), (0, 3), (1, 1), (2, 4)\}$. Then the range of g is:

- a) $\{1, 2, 3, 4\}$ b) $\{-2, -1, 0, 1, 2\}$ c) $[-2, 2]$ d) $[1, 4]$ e) none of these

II. SHOW ALL WORK ON EACH OF THE FOLLOWING PROBLEMS**In problems 7 – 9 perform the indicated operations.**

7. Evaluate: $4ps - r^2$ for $r = -3$, $p = -2$, $s = -1$ (3 pts)

8. $-5 - (3 - 3 \cdot 4 \div 2) - 5 \cdot |-1|$ (3 pts)

9. $\frac{-2 - 2}{3 - 6} - \frac{1}{3} \div \left(\frac{1}{3} - \frac{1}{4}\right)$ (4 pts)

Solve each of the following equations or inequalities: (3 pts each)

10. $\frac{2}{5}x - \frac{1}{3} = \frac{2}{3}x + \frac{1}{4}$

11. $3(x - 3) + 7x - 4 = 10x - 10$

12. $-3(x - 3) - (2x - 2) = (x - 4) - (3x + 1)$

13. $\frac{x + 3}{8} - \frac{2x - 1}{20} = 3$

14. $-7x + 2(x - 3) \leq 6 - 10x$
Give solution as an inequality and as a graph.

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Solve each of the following. Show the complete problem solving process:

- 1. Choose a variable expression to represent each unknown and describe them.**
 - 2. Write an equation.**
 - 3. Show all steps in the equation solving process.**
 - 4. Write a complete sentence answer. (5 pts each)**
15. Find three consecutive even integers such that the sum of the first and twice the last is two more than the middle number.
16. After a 15% price reduction a computer is on sale for \$1062.50. What was the original price of the computer?

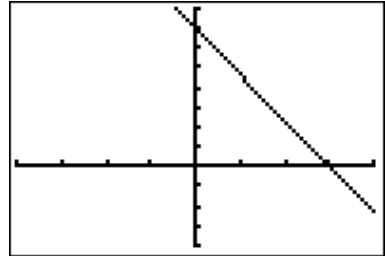
17. The measure of the second angle of a triangle is twice as large as the measure of the first. The measure of the third angle is 30° less than the sum of the measures of the other two angles. Find the measure of each angle.
18. Thirty gallons of a 20% acid solution is needed for an experiment. Only 40% and 10% acid solutions are available. How much of each should be mixed to form the needed solution?

Find the slope of each of the following lines (19 - 20):

(2 pts each)

19. The line $6 + 3x = 0$

20. The line having the graph shown:



21. Without graphing, determine whether the graphs of the following two equations are parallel, perpendicular or neither. Show work.

$$3x + 2y + 6 = 0$$

$$-8x = 12y + 24$$

(3 pts)

Find the slope-intercept form of the equation of each line in problems 22 - 25:

22. The line passing through the points $(1, -4)$ and $(-2, -3)$. (4 pts)

23. The line having an x - intercept of 4 and a y - intercept of -3 (4 pts)

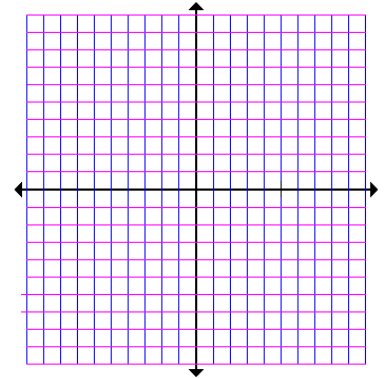
24. The line passing through the point $(4, -1)$ perpendicular to the line having equation $x - 2y = 5$. (4 pts)

25. The line parallel to the y - axis passing through the point $(-3, 5)$. (2 pts)

26. Find the x and y -intercepts for the graph of the equation $4x - y = 3$ then graph all of the solutions to the equation. (4 pts)

x -intercept (write as an ordered pair):

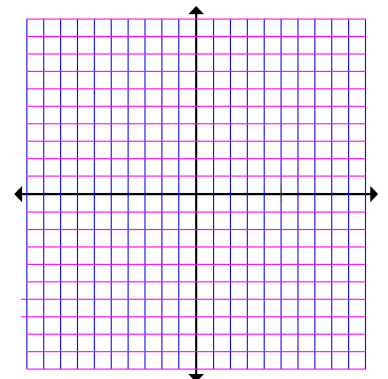
y -intercept (write as an ordered pair):



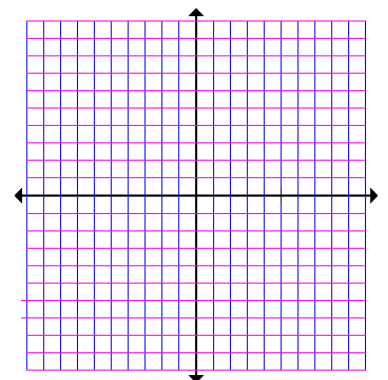
27. Find the slope and y -intercept of the line having equation $4x - 3y = 6$ and use the slope and y -intercept to graph the solutions to the equation. (4 pts)

Slope: _____

y -intercept: _____



28. Sketch the graph of all solutions to the equation $-2x - 8 = 0$. (2 pts)



29. Let $f(x) = -x^2 + 2x + 1$. Completely simplify each answer.

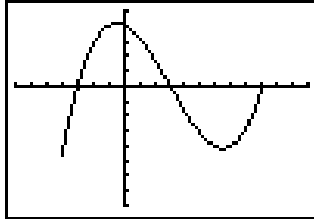
4 pts

a) $f(-1) =$

b) $2f(m) - 1 =$

30. The function f is graphed on the right.

5 pts

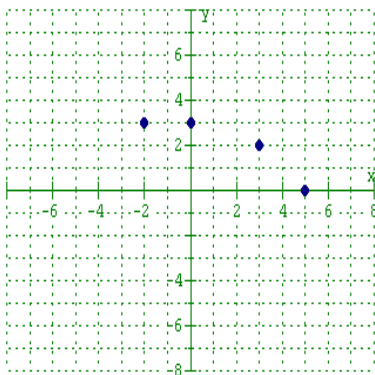


a) What is the domain of f ?

b) What is the range of f ?

c) What is the argument(s) for the image 0?

31. Let $g = \{(-1, 2), (0, 1), (1, 0), (2, -1)\}$; $m(x) = 1 - x^2$; $h(x)$ is represented by the graph shown below. 3 pts



Find each of the following:

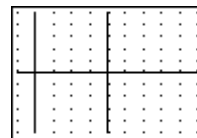
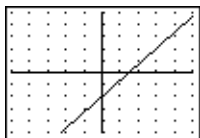
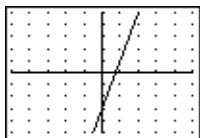
a) $g(2)$

b) $m(-1)$

c) $h(0)$

Answers:

1. e
2. a
3. c
4. c
5. b
6. a
7. - 1
8. - 7
9. $-\frac{8}{3}$
10. $-\frac{35}{16}$
11. no solution
12. $\frac{16}{3}$
13. 103
14. $x \leq \frac{12}{5}$
15. - 2, 0, 2
16. \$1250
17. 35, 70, 75 degrees
18. 20 gallons of 10% solution, 10 gallons of 40% solution
19. undefined slope
20. $-\frac{7}{3}$
21. neither
22. $y = -\frac{1}{3}x - \frac{11}{3}$
23. $y = \frac{3}{4}x - 3$
24. $y = -2x + 7$
25. $x = -3$
26. $(\frac{3}{4}, 0), (0, -3)$
27. $m = \frac{4}{3}, b = -2$
- 28.



- 29a. -2 29b. $-2m^2 + 4m + 1$
 30a. [-4,9] 30b. [-4,4] 30c. -3, 3, 9
 31a. -1 31b. 0 31c. 3