

Name: \_\_\_\_\_

Section: \_\_\_\_\_

MA 109  
Exam 2

Spring 2014  
March 12, 2014

**Directions:**

- Do not remove this page—you will turn in the entire exam. You have two hours to do this exam. No books or notes may be used. You may use a graphing calculator during the exam, but NO calculator with a Computer Algebra System (CAS) or a QWERTY keyboard is permitted. Absolutely no cell phone use during the exam is allowed.
- The exam consists of multiple choice and short answer questions. Record your answers on this page by filling in the appropriate selection, for example:

A  B  C  D  E.

- The exam is out of 100 total points: 5 points for each of 20 questions. **Only** this front page will be graded and **no partial credit** will be awarded. It is recommended that you check your work!

1.  A  B  C  D  E

14.  A  B  C  D  E

2.  A  B  C  D  E

15.  A  B  C  D  E

3.  A  B  C  D  E

16.  A  B  C  D  E

4.  A  B  C  D  E

17.  A  B  C  D  E

5.  A  B  C  D  E

18.  A  B  C  D  E

6.  A  B  C  D  E

19.  A  B  C  D  E

7.  A  B  C  D  E

20.  A  B  C  D  E

8.  A  B  C  D  E

Bonus questions for exam 1

9.  A  B  C  D  E

21.  A  B  C  D  E

10.  A  B  C  D  E

22.  A  B  C  D  E

11.  A  B  C  D  E

23.  A  B  C  D  E

12.  A  B  C  D  E

24.  A  B  C  D  E

13.  A  B  C  D  E

25.  A  B  C  D  E

**For grading use:**

<b>Total</b>		<b>Total</b>	
	(out of 100 pts)		(out of 25 pts)

Name: \_\_\_\_\_

Section: \_\_\_\_\_

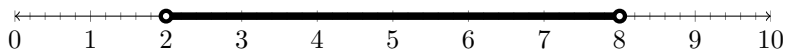
**Multiple Choice:** Show your work in the space below and shade the correct answer on the front page for each of the following.

1. Find the slope of the line through the points (2,1), (-1,3).

**Choices:**

- (a)  $\frac{-2}{3}$
- (b)  $\frac{-3}{2}$
- (c)  $\frac{4}{3}$
- (d)  $\frac{-4}{3}$
- (e)  $\frac{3}{2}$

- 
2. Which one of the inequalities has the following graph as its full set of solutions?



**Choices:**

- (a)  $|x - 5| \leq 3$
- (b)  $|x - 5| < 3$
- (c)  $|x - 2| > 6$
- (d)  $|x - 8| < 6$
- (e)  $|x + 5| < 3$

- 
3. Find the equation of the line through the point (-2,1) with slope -3.

**Choices:**

- (a)  $y = 3x + 3$
- (b)  $y = -3x + 1$
- (c)  $y = -3x - 5$
- (d)  $y = -2x - 3$
- (e)  $y = 2x + 3$

4. Solve the inequality  $5x - 2 \leq x + 6$ .

**Choices:**

- (a)  $(-\infty, 2]$
  - (b)  $(-\infty, 2)$
  - (c)  $[-2, \infty)$
  - (d)  $[2, \infty)$
  - (e)  $[4, \infty)$
- 

5. Use a graphing calculator to approximate the real solutions to the equation below.

$$x^3 + 2x - 5 = 0$$

**Choices:**

- (a)  $x \approx -2.0946$
  - (b)  $x \approx 1.3283$
  - (c)  $x \approx 1.2763$
  - (d)  $x \approx 1.4894$
  - (e)  $x \approx 1.7099$
- 

6. Determine all solutions to the system  $\begin{cases} x + y = 3 \\ x - y = -2 \end{cases}$

**Choices:**

- (a)  $(1, 2)$
  - (b)  $(6, 8)$
  - (c)  $(1, 3)$
  - (d)  $\left(\frac{1}{2}, \frac{5}{2}\right)$
  - (e)  $\left(\frac{3}{2}, \frac{2}{5}\right)$
-

7. Use a graphing calculator to determine how many real solutions the equation  $x^4 - x - 4 = 2x + 4$  has.

**Choices:**

- (a) Exactly four real solutions.
  - (b) Exactly one real solution.
  - (c) Exactly two real solutions.
  - (d) The equation has no real solutions.
  - (e) Exactly three real solutions.
- 

8. If a student has exam scores of 88, 62, and 79 on his first three exams, what does he need on the fourth exam to have an average of 80.

**Choices:**

- (a) 91
  - (b) 85
  - (c) 95
  - (d) 100
  - (e) The student can not obtain an average of 80.
- 

9. Which one of the following equations can not be solved algebraically and so must be solved graphically?

**Choices:**

- (a)  $\frac{1}{x+1} - \frac{5}{x-3} = 10$
  - (b)  $x^2 - x + 1 = 0$
  - (c)  $3x^5 - 1 = 0$
  - (d)  $\sqrt{x-2} = 5x$
  - (e)  $x^3 + x = x^2 - 1$
-

10. Which statement best describes the slope of a line?

**Choices:**

- (a) The slope of a line changes from point to point.
  - (b) The slopes of two perpendicular lines are the same.
  - (c) A vertical line has a slope of 0.
  - (d) The slope of a line is calculated by the ratio run over rise.
  - (e) The slope of a line represents the rate of change of the line.
- 

11. How many liters of a 10% solution of acid must be mixed with 20 liters of a 20% solution of acid to produce an 18% solution of acid?

**Choices:**

- (a)  $\frac{7}{3}$  liters.
  - (b) The final solution can not be obtained.
  - (c)  $\frac{5}{2}$  liters.
  - (d) 5 liters.
  - (e) 50 liters.
- 

12. Find the slope of the line  $2x + 4y = 10$ .

**Choices:**

- (a)  $-\frac{1}{2}$
  - (b) 2
  - (c)  $\frac{1}{2}$
  - (d) -1
  - (e) -2
-

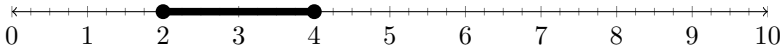
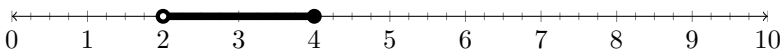
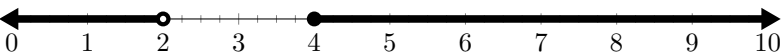
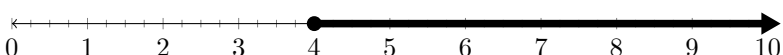
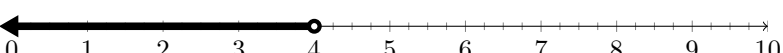
13. Which is the full set of solutions to  $|x - 5| > 3$ ?

**Choices:**

- (a)  $(-\infty, -2] \cup [8, \infty)$
  - (b)  $(5, 8)$
  - (c)  $(-\infty, 2) \cup (8, \infty)$
  - (d)  $[2, 8]$
  - (e)  $(-\infty, 5)$
- 

14. Which is the full set of solutions to  $\frac{x - 4}{x - 2} \geq 0$ ?

**Choices:**

- (a) 
  - (b) 
  - (c) 
  - (d) 
  - (e) 
- 

15. Given a system of two equations where the graph of one equation is a line and the other graph is a circle, what are the possible number of solutions to the system?

**Choices:**

- (a) Always two solutions.
  - (b) One or two solutions only.
  - (c) One, two, or no solutions.
  - (d) Any number of solutions depending on the graphs.
  - (e) Two solutions or no solution only.
-

16. Given the two lines  $y = 2x + 3$  and  $y = -2x + 1$ , which one of the following statements is true?

**Choices:**

- (a) The lines are parallel.
  - (b) The lines are perpendicular.
  - (c) The two lines are the same.
  - (d) The two lines intersect at exactly one point.
  - (e) The two lines intersect at more than one point.
- 

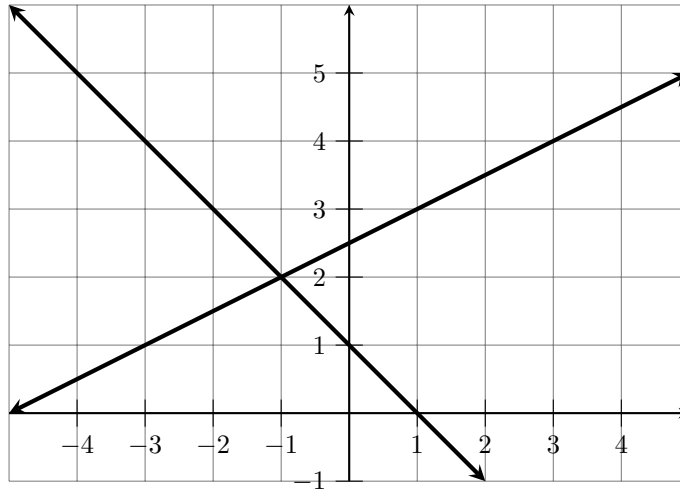
17. Solve the inequality

$$(x - 3)(x + 5) < 0.$$

**Choices:**

- (a)  $(-\infty, 3] \cup [5, \infty)$
  - (b)  $(-\infty, -3) \cup [5, \infty)$
  - (c)  $(-5, 3)$
  - (d)  $[-5, 3]$
  - (e)  $(5, \infty)$
-

18. Suppose you are given a system of equations whose graphs are shown in the picture below. Determine an approximate solution to this system.



**Choices:**

- (a)  $(-1, 2)$
- (b)  $(-\infty, -1]$
- (c)  $(2, \infty)$
- (d)  $(-2, 1)$
- (e)  $(1, 2)$

- 
19. If the graph of  $y^2 + 3x - 2 = 0$  is to be displayed on a calculator, which of the following statements best describes the procedure?

**Choices:**

- (a) Solve for  $y$  and enter it into the calculator as a single equation.
  - (b) Solve for  $x$  and enter it into the calculator as a single equation.
  - (c) Solve for  $y$  and enter it in the calculator as two separate equations.
  - (d) Enter the equation directly into the calculator.
  - (e) The graph of the equation can not be displayed on a graphing calculator.
-



20. Determine all solutions to the system  $\begin{cases} x^2 + y = 3 \\ y - 2x = 0 \end{cases}$

**Choices:**

- (a) The system has no solution.
  - (b)  $(-3, -6)$  only.
  - (c)  $(1, 1)$  only.
  - (d)  $(1, 2)$  and  $(-1, -1)$ .
  - (e)  $(-3, -6)$  and  $(1, 2)$ .
- 

**Bonus Multiple Choice:** Show your work in the space below and shade the correct answer on the front page for each of the follow

21. Solve the following equation for x.

$$5x^2 - 3x = 1$$

**Choices:**

- (a)  $\frac{3 \pm \sqrt{29}}{10}$
  - (b) The equation has no real solution.
  - (c)  $\frac{\pm\sqrt{2}}{5}$
  - (d)  $\frac{6 \pm \sqrt{11}}{10}$
  - (e)  $\frac{1 \pm \sqrt{29}}{5}$
- 

22. Find the distance in the plane between the points  $(2,1)$  and  $(3,-1)$ .

- (a) 5
  - (b)  $\sqrt{5}$
  - (c) 1
  - (d)  $\pm\sqrt{5}$
  - (e)  $\sqrt{27}$
-

23. Find the equation of the circle with center  $(-1,3)$  such that the point  $(5,3)$  is on the circle.

**Choices:**

- (a)  $(x + 1)^2 + (y - 3)^2 = 36$
  - (b)  $(x - 1)^2 + (y + 3)^2 = 36$
  - (c)  $(x - 5)^2 + (y - 3)^2 = 6$
  - (d)  $(x - 5)^2 + (y - 3)^2 = 4$
  - (e)  $(x + 1)^2 + (y - 3)^2 = 16$
- 

24. Solve the following equation for  $x$ .

$$x - 1 = \sqrt{-2x + 2}$$

**Choices:**

- (a)  $x = \pm 1$
  - (b) The equation has no real solutions.
  - (c)  $x = 2$  only.
  - (d)  $x = 1$  only.
  - (e)  $x = \pm 3$
- 

25. Which one of the following points is on the graph of the equation

$$x^2 - 3xy = -5?$$

**Choices:**

- (a)  $(1, 3/2)$
  - (b)  $(0, 4)$
  - (c)  $(1, 2)$
  - (d)  $(2, 1)$
  - (e)  $(-1, 2/3)$
-