

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

**MS5 Exam 4 Review Sheet**

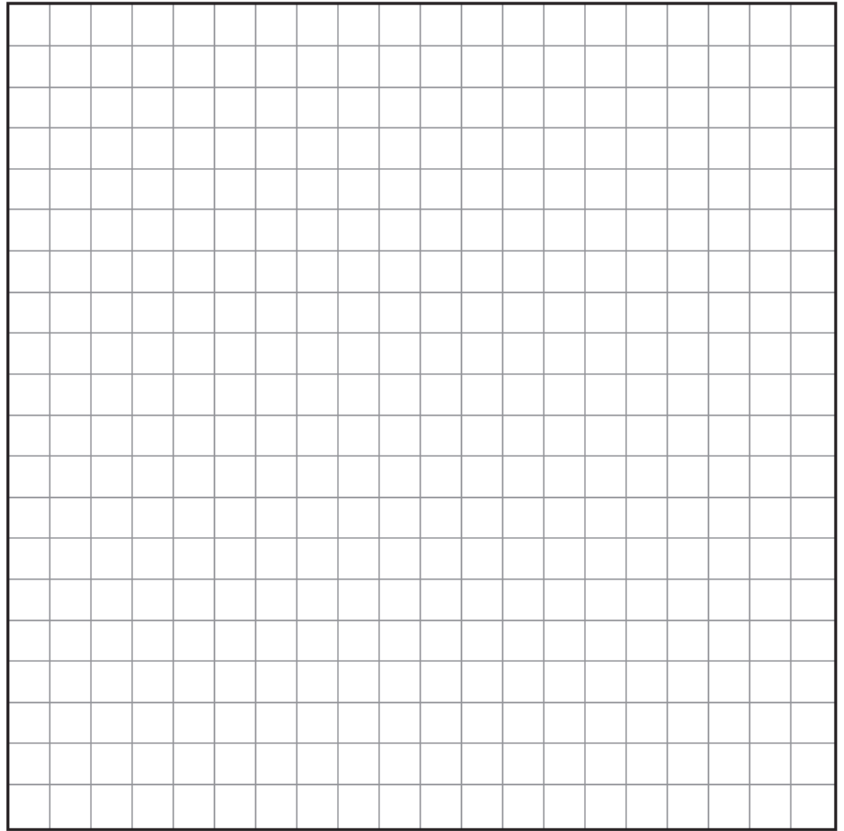
**Exam 4 will be on Tuesday, December 11, 2007.** The exam will focus on the following topics: parabolas, circles, ellipses, and hyperbolas; inverse variation (including its graph, the equilateral hyperbola); finding inverse functions algebraically and graphically (by reflecting in the line  $y = x$ ); and solving application problems involving quadratic functions. Though the emphasis will be on these topics, you are still expected to know all of the concepts and skills taught since the beginning of the semester. Graphing calculators are *required* on this exam, but the following are not permitted: TI-89, TI-92, or any calculator with symbolic manipulation abilities.

- The graph of the equation  $y = (x + 2)^2$  is
  - a straight line
  - a circle
  - an ellipse
  - a parabola
- If the graphs of  $x^2 + y^2 = 16$  and  $y = -3$  were drawn on the same set of axes, the total number of points common to the graphs would be:
  - 1
  - 2
  - 3
  - 4
- If  $r$  varies inversely as  $s$ , then their
  - difference is constant
  - sum is constant
  - quotient is constant
  - product is constant
- The equation whose graph is an ellipse is
  - $4x^2 + 9y = 18$
  - $3x^2 = 7 + 5y^2$
  - $3x^2 = 7 - 5y^2$
  - $4x + 9y = 36$
- Write an equation for the axis of symmetry of the graph of  $y = 3x^2 - 12x + 5$ .
- When the graphs of the equations  $xy = -16$  and  $y = -x$  are drawn on the same set of axes, what is the total number of common points?
- Write the equation of an ellipse with center  $(-4, 2)$  and that is tangent to both the  $x$ -axis and the  $y$ -axis.
- Write the equation of a hyperbola centered at the origin with  $y$ -intercepts of 4 and  $-4$ .
- The price per person to rent a limousine for a prom varies inversely as the number of passengers. If five people rent the limousine, the cost is \$70 each. How many people are renting the limousine when the cost *per couple* is \$87.50?
- Harmony and Melodie were blowing bubbles when one of them landed on Derek's math homework and burst on the graph paper. The bubble formed a perfect circle on the coordinate grid with a center at  $(6, -5)$  and a radius of 4.5. Which of the following represents the equation of the bubble's circle?
  - $4.5^2 = (x - 6)^2 + (y + 5)^2$
  - $(x + 6)^2 + (y - 5)^2 = 20.25$
  - $x^2 + y^2 = (4.5)^2$
  - $(x - 6)^2 - (y + 5)^2 = 20.25$
- Find the axis of symmetry and the coordinates of the vertex of the parabola:  $y = 4x^2 - 8x - 12$ .
- Which of the following equations represents a hyperbola that intersects the  $y$ -axis?
  - $15(x + 6)^2 - 20(y - 5)^2 = 205$
  - $4(y - 4)^2 = 17(x + 4)^2 + 100$
  - $xy = -30$
  - $4y = 17x + 100$

13. A model rocket is launched from ground level. At  $t$  seconds after it is launched, it is  $h$  meters above the ground, where  $h(t) = -4.9t^2 + 68.6t$ . What is the maximum height, to the *nearest meter*, attained by the model rocket? After how many seconds does the model rocket hit the ground? [*Only an algebraic solution will be accepted.*]

14. Find the inverse of the function  $f(x) = \frac{2}{3}x + 1$  and sketch both  $f$  and  $f^{-1}$  on the accompanying grid.

State the coordinates of a point on the inverse function.



15. Sketch the graphs of the following equations on the accompanying grid:

$$\frac{(x-2)^2}{9} - \frac{(y-2)^2}{4} = 1$$

$$16(x-2)^2 + 9(y-6)^2 = 144$$

