

M\$5 Exam 5 is on Tuesday, December 9, 2008

Topics:

- Finding Inverses Graphically
- Graphing Quadratic Functions Using the Graphing Calculator
- Transformations of Quadratic Functions and Absolute Value Functions
- Inverse Variation and the Rectangular Hyperbola
- Circles
- Ellipses
- Hyperbolas
- Identifying Conic Sections

A graphing calculator is required for this exam.

M\$5 Homework 45

1. Sketch the graph of $y = |x - 3| + 4$ and sketch the graph of its inverse on the same set of axes. Is the inverse a function?



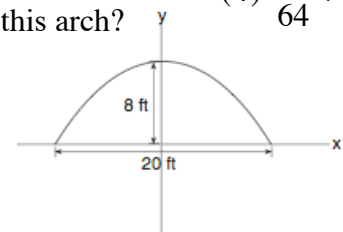
2. Write the equation for the axis of symmetry of the graph of $y = 3x^2 - 12x + 5$.
3. The efficiency department of a mail and phone order company discovered the accuracy of phone orders varied inversely as the number of hours in the operator's shift. If employees who worked two-hour shifts were 98% accurate, how many hours were worked by those with 24.5% accuracy?

4. When the graphs of $xy = -16$ and $y = x$ are drawn on the same set of axes, what is the total number of common points?
(1) 1 (2) 2 (3) 3 (4) 0

5. Which of the following equations represents a hyperbola that intersects the y-axis?
(1) $15(x + 6)^2 - 20(y - 5)^2 = 205$
(2) $xy = -30$
(3) $4(y - 4)^2 = 17(x + 4)^2 + 100$
(4) $4y = 17x + 100$

6. Write the equation of an ellipse with center $(-4, 2)$ that is tangent to both the x-axis and the y-axis.

7. An architect is designing a building to include an arch in the shape of a semi-ellipse (half an ellipse), such that the width of the arch is 20 feet and the height of the arch is 8 feet, as shown in the accompanying diagram. Which equation models this arch?



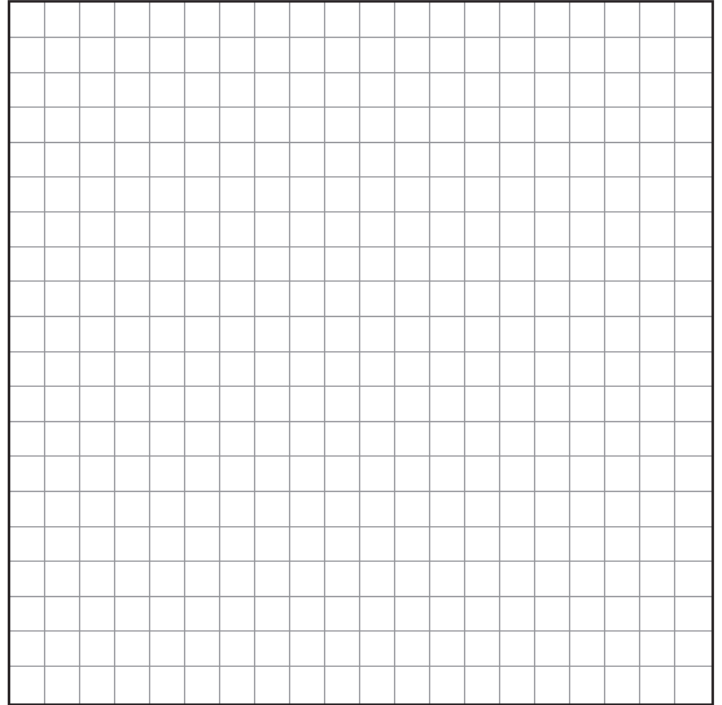
- (1) $\frac{x^2}{100} + \frac{y^2}{64} = 1$
(2) $\frac{x^2}{400} + \frac{y^2}{64} = 1$
(3) $\frac{x^2}{64} + \frac{y^2}{100} = 1$
(4) $\frac{x^2}{64} + \frac{y^2}{400} = 1$

8. 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.]

9. Graph the following equations on the same set of axes. State the number of points that are common to both graphs.

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

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



10. Olive Math is standing on the 102nd floor of the Empire State Building, thinking about mathematics. She realizes that, if she were able to throw a ball from her present position, the height of the ball in feet, h , at time t seconds could be modeled by the equation

$$h(t) = -16t^2 + 64t + 1,224$$

- Graph the equation on the accompanying grid and state the window.
- How high above the ground is the 102nd floor?
- What is the greatest height the ball would reach?
- How long would it take to reach that height?
- How long would it take the ball to hit the ground?

