

Name _____

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May 6, 2003

Honors Pre-Calculus Test

Chapter 8

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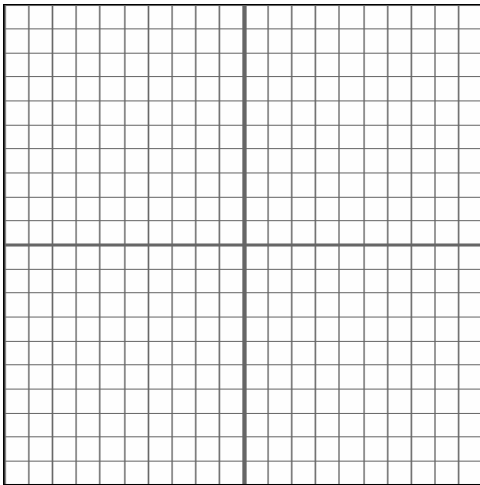
1. (20%)	_____
2. (20%)	_____
3. (20%)	_____
4. (15%)	_____
5. (25%)	_____
grade	_____

This test consists of five multi-part problems.

1. Consider the curve described by these parametric equations: $x = 6 \cos(t) + 3$, $y = 8 \sin(t) - 2$.

a. Which type of curve is this? _____

b. On the given grid, sketch a graph of the curve.



The window for this grid is $[-10, 10]$ by $[-10, 10]$.

c. Write a rectangular equation that describes the same curve.

d. Calculate the coordinates of the focal point(s).

e. Add the focal point(s) to the graph you drew in part b.

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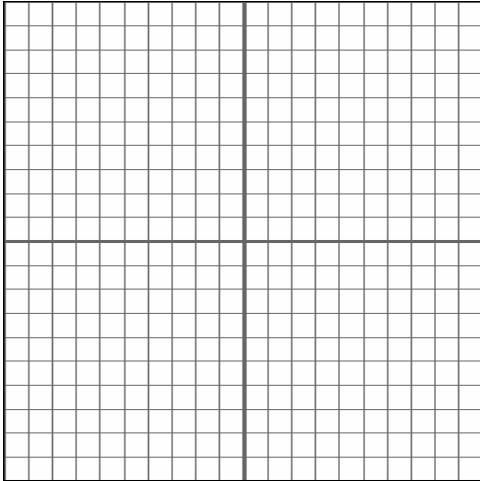
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2. Here is some given information about a hyperbola:

- The hyperbola is a dilation of the “unit hyperbola” $y^2 - x^2 = 1$.
- The vertices of the hyperbola are 8 units apart from each other.
- The asymptotes are the lines $y = \pm 2x$.

a. On the given grid, sketch the hyperbola and its asymptotes.



The window for this grid is $[-10, 10]$ by $[-10, 10]$.

b. Write a rectangular equation for the hyperbola.

c. Write a pair of parametric equations for the hyperbola.

d. For hyperbolas, eccentricity is defined as $e = \frac{c}{a}$. Find the eccentricity of this hyperbola.

e. Take just the part of this hyperbola that lies in the 4th quadrant. Let $f(x)$ be the function that has this graph. Find a function formula in the form $f(x) = \dots$.

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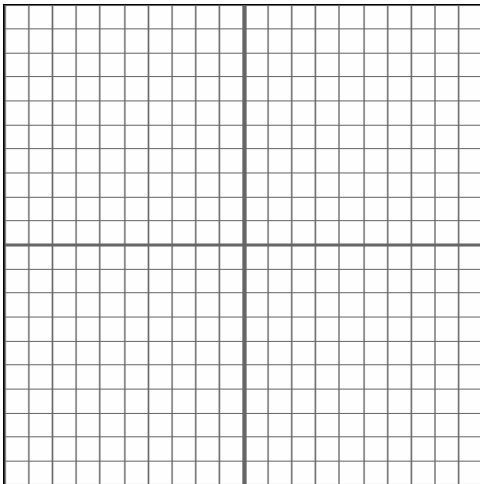
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3. The equation $x^2 + 2xy + 4y^2 = 16$ describes a non-degenerate conic section.

a. Which type of curve is this? Show a calculation that can be used to decide.

b. The direction angle is an angle α between 0° and 90° satisfying $\tan(2\alpha) = \frac{B}{A-C}$.
Find the direction angle for this curve.

c. With the help of your calculator, sketch a graph of the curve.



The window for this grid is $[-10, 10]$ by $[-10, 10]$.

4. Answer the following questions about the curve $xy = -25$.

a. Which type of curve is this?

b. What lines are the asymptotes of this curve?

c. What lines are the axes of this curve?

d. Find the coordinates of the vertices of this curve.

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5. Suppose that line d is the y -axis, point $F = (4, 1)$, and point $P = (x, y)$.

a. Write formulas for the following distances.

(distance from P to F) = _____

(distance from P to d) = _____

b. Consider the set of points P such that (distance from P to F) = (distance from P to d).

(i) Which type of curve is this? _____

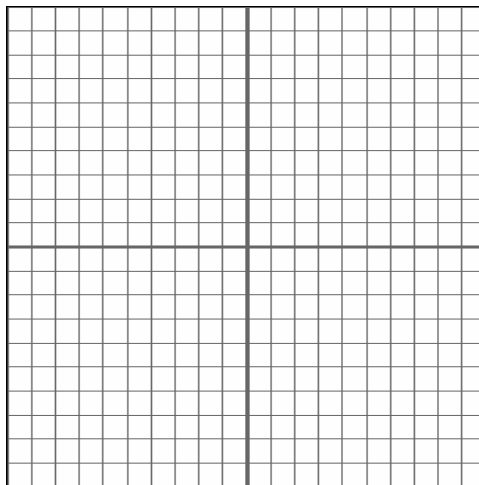
(ii) Set your distance formulas from part a equal to each other.

Simplify the equation into a standard form for the type of curve you named above.

c. Consider the set of points P such that $3 \cdot$ (distance from P to F) = (distance from P to d).

(i) Which type of curve is this? _____

(ii) Draw a graph of this curve. (The vertex or vertices must be located at the correct coordinates. The rest of the curve may be sketched approximately.)



The window for this grid is $[-10, 10]$ by $[-10, 10]$.

d. Explain how the concept of eccentricity relates to parts b and c of this problem. Include the eccentricity values of the two curves in your explanation.