

MATH 2422 - Calculus 3A

Sample PRE-TEST

Directions: Write your name on the top of this sheet. This test covers essential problems regarding conic sections, polar coordinates, parametric equations, differentiation, and integration. *There will be no partial credit.*

1. (6 pts) Match the graph with the equation.

___(i) $2x^2 = 4y^2 - 3$

A line

___(ii) $2x = -4y^2 + 3$

B circle

___(iii) $\sqrt{5}x + \frac{y}{2} = \sqrt{2}$

C parabola

___(iv) $\sqrt{5}x^2 + \frac{y^2}{4} = \sqrt{2}$

D hyperbola

___(v) $\pi x^2 = -\pi y^2 + 7$

E ellipse

___(vi) $\pi x^2 = -\pi y^2 - 7$

F None of the above.

2. (4 pts) Re-write the following equation in polar coordinates:

$$y = -\frac{\sqrt{3}}{3}x$$

3. (4 pts) Sketch the curve, indicating *clearly* the direction of the curve for increasing t :

$$x = 5 \cos(t) \quad y = -2 \sin(t)$$

4. (4 pts) Find the derivative of

(a) $y = \cos(e^{2x})$.

(b) $y = \frac{x}{\ln(x)}$

5. (4 pts) Give the (x, y) coordinate of the absolute maximum of $y = x^3 - 3x^2 + 3x$ over the interval $0 \leq x \leq 2$.

6. (4 pts) Evaluate

(a) $\int \frac{\ln(2x)}{x} dx.$

(b) $\int x \sin(x) dx$

7. (4 pts) Find the area bounded by $x = 1$, $x = 3$, $y = \frac{1}{2}(x - 1)^2$, and $y = 2x - 2$.