

MATH 005B Exam Chapter 10 – 11.4 Name: _____

1. Put the hyperbola in standard form and find the values as indicated:

$$4x^2 - 3y^2 - 8x + 24y + 5 = 0$$

Center: _____

Foci: _____

Vertices: _____

Asymptotes: _____

2. Put the ellipse in standard form and find the values as indicated:

$$4x^2 + 3y^2 - 8x + 24y + 5 = 0$$

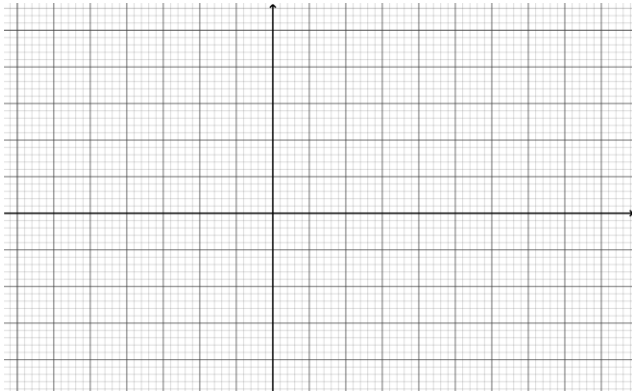
Center: _____

Foci: _____

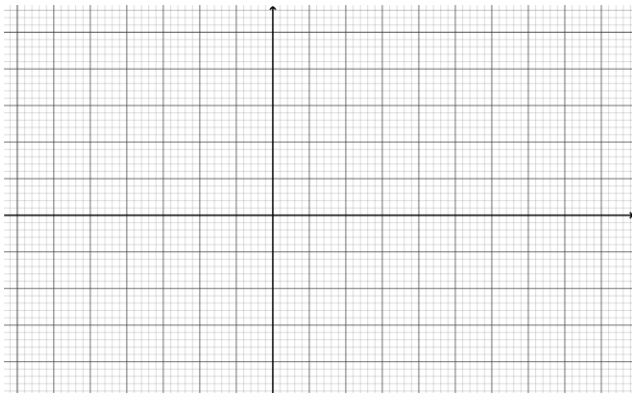
3. Find the equation for a parabola with focus: (3, -4) and directrix $x = -1$.

Describe the shape of the parametrically defined curve (eg, upper half of circle with radius = 3, centered at (1, -2)) and sketch.

4. $x(t) = 5\cos(t) + 5$; $y(t) = 5\sin(t) - 2$, $-\pi \leq t \leq \pi$.



5. $x(t) = -2\sin(t/3)$; $y(t) = 2\cos(t/3) + 2$; $0 \leq t \leq \pi/2$.



6. Set up an integral (do not solve) for the length of the curve in #5.

Bonus: What is the answer to #6, without doing any calculus?

7. For the point with (x, y) coordinates : $(4, -4\sqrt{3})$

Find polar coordinates satisfying the conditions:

A) $0 \leq r$; $0 \leq \vartheta \leq 2\pi$

B) $0 \leq r$; $-2\pi \leq \vartheta \leq 0$

C) $r \leq 0$; $0 \leq \vartheta \leq 2\pi$

D) $r \leq 0$; $-2\pi \leq \vartheta \leq 0$

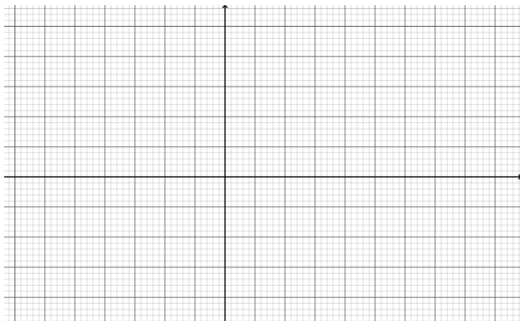
8. Find rectangular coordinates for the point with polar coordinates:

A) $r = -3$; $\vartheta = -7\pi/4$

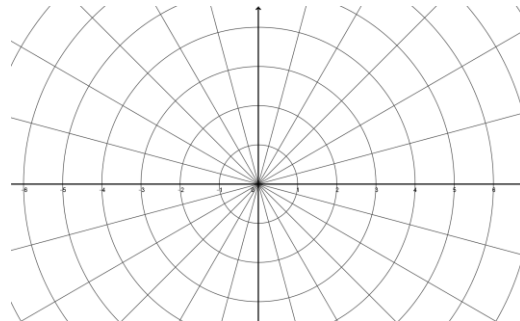
B) $r = 2$; $\vartheta = 5\pi/2$

9. First sketch the (x, y) graph; then sketch the $[r, \vartheta]$ graph:

A) $y = 2 \sin(x) - 1$



B) $r = 2 \sin(\vartheta) - 1$



10. For the graph in 9B: Find the equations (in rectangular form) for the tangent lines where the graph intersects the origin.

11. For the graph in 9B: Set up an integral representing the area inside the smaller loop.

12. If $a_0 = 3$ and $a_{n+1} = (n+1)a_n$, find a_1 , a_2 and a_3 .

13. Find the exact value of the series, or explain why it diverges:

A) $\sum_{n=1}^{\infty} \frac{4^{n-2}}{5^{2n+1}}$

$$\text{B) } \sum_{n=1}^{\infty} e^{1/n} - e^{1/(n+1)}$$

14. Decide whether each of the following converges or diverges. State specifically the test you are using, and demonstrate that test, carefully.

$$\text{A) } \sum_{n=3}^{\infty} \frac{n+7}{(n-2)^2}$$

$$\text{B) } \sum_{n=1}^{\infty} n e^{-n}$$

$$\text{C) } \sum_{n=3}^{\infty} \frac{\sqrt{n^2+n}}{n^4-5}$$