

MAC 1140, Fall 2017.

Exam #4

November 20, 2017

Name _____

- You will be told when to begin the work and when to terminate work on the examination. You must stop when instructed. Points may be deducted in case of violations.
- Please show your work to support your answers that require calculations. Correct but unsupported answers may not be given full credit.
- The use of a cell phone or other electronic communication devices during the examination is not allowed. The exam will be canceled and a grade of "0" will be assigned to anyone who uses a cell phone during the examination or if one is found within hands reach.
- Calculators are not allowed on this exam.
- The exam consist of two parts. Part I contains four multiple choice questions worth 8 points each. Part II contains three open ended questions worth 26 points each if not stated otherwise.

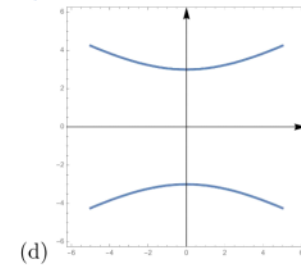
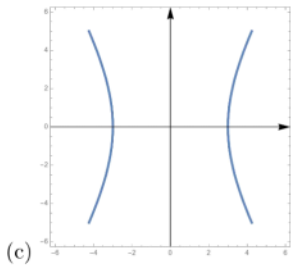
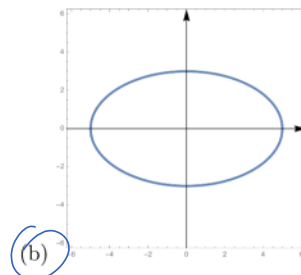
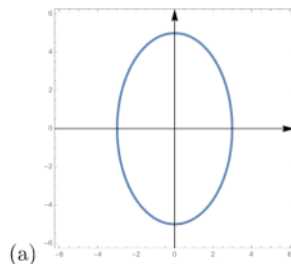
Part I

Choose your answer from five available choices. No partial credit will be given for wrong answers.

1. The equation $2x^2 + 10x - y - 37 = 0$ describes which of the following?

- (a) Parabola
- (b) Ellipse
- (c) Straight line
- (d) Hyperbola
- (e) None of the above

2. Which of the following is the graph of the equation $\frac{x^2}{25} + \frac{y^2}{9} = 1$?

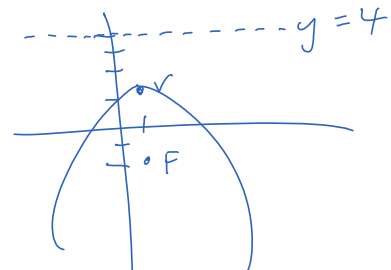


3. In the standard equation of an hyperbola, the relationship between a , b , and c can be described by the following equation

- (a) $c^2 = a^2 + b^2$
- (b) $c^2 = a^2 - b^2$
- (c) $c^2 = b^2 - a^2$
- (d) $c = a + b$
- (e) None of the above

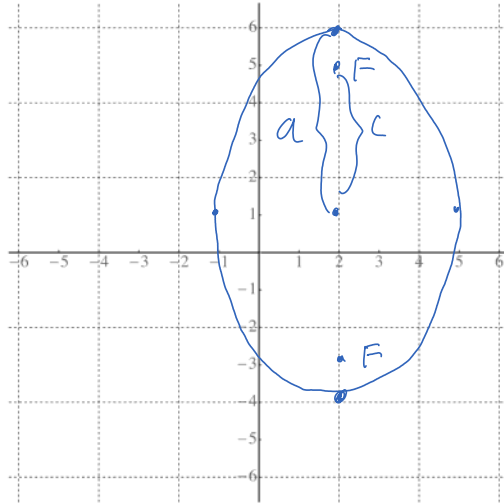
4. A parabola has the vertex at $(1, 1)$ and the focus at $(1, -2)$. The equation of the directrix is

- (a) $x = 1$
- (b) $x = 0$
- (c) $y = 4$
- (d) $y = -5$
- (e) None of the above



Part II

5. Find the equation of the ellipse with vertices $(2, 6)$, $(2, -4)$ and a focus $(2, 5)$. Graph the ellipse.



$$a = 5, c = 4$$

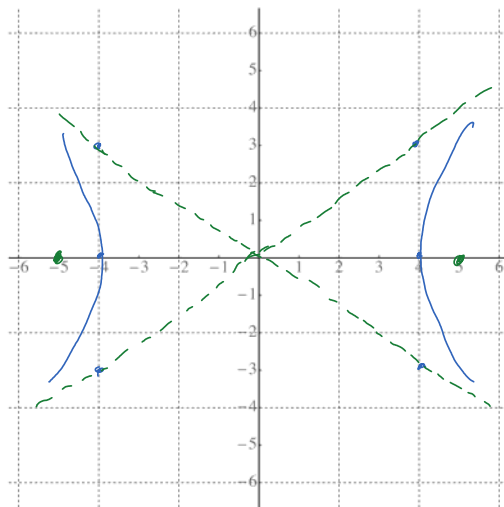
$$c^2 = a^2 - b^2$$

$$16 = 25 - b^2 \rightarrow b^2 = 25 - 16$$

$$b = \sqrt{9} = 3$$

$$\frac{(x-2)^2}{9} + \frac{(y-1)^2}{25} = 1$$

6. Graph the equation $\frac{x^2}{16} - \frac{y^2}{9} = 1$. Find the center, vertices, foci and asymptote, if any.



hyperbola, $a^2 = 16, b^2 = 9$

$$c^2 = 16 + 9 = 25$$

$$c = 5$$

center: $(0, 0)$

vertices: $(\pm 4, 0)$

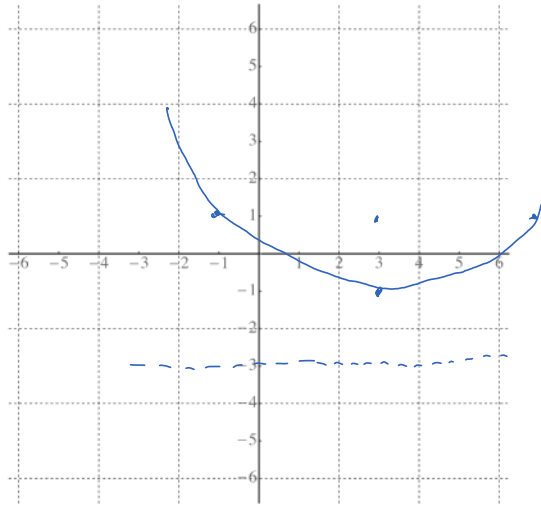
foci: $(\pm 5, 0)$

asymptotes: $y = \pm \frac{3}{4}x$

7. Write the standard equation of the the conic given by the following equation:

$$x^2 - 8y - 6x + 1 = 0.$$

Graph the equation and give coordinates of center, foci, vertices, directrix and asymptotes, if any.



$$\begin{aligned}x^2 - 6x &= 8y - 1 \\x^2 - 6x + 9 &= 8y - 1 + 9 \\(x-3)^2 &= 8(y+1) \quad \text{parabola} \\ \text{vertex: } &(3, -1) \quad 4p = 8 \\ & \quad \quad \quad p = 2 \\ \text{focus: } &(3, 1) \\ \text{directrix: } &y = -3\end{aligned}$$