| Name: | |
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| Date: | Period: |

Unit 10 – Conics – Graphing Parabolas with a Focus

Identify the direction the parabola opens, vertex, axis of symmetry, focus, and directrix of each parabola. Then graph the parabola.



5.
$$(y-1)^2 = -12(x-4)$$

4.
$$(x-4)^2 = 6(y+1)^2$$



<u>Unit 10 – Conics – Writing Parabolas in Focus Standard Form</u>

Write the standard equations for the following parabolas, then state the direction it opens.

- 1. $x^2 14x y + 41 = 0$ (x-7)²=(y+8) (x-1)²=(y+7)
- **3.** $y^2 + 12y + 75 = x 42$ **4.** $y^2 - 2x + 16y = -64$
- $(y+6)^2 = (x-81)$ $(y+8)^2 = 2x$

Graph each parabola after writing it in standard form. Then find the following.

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

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



7. Vertex : (-3,7)Focus : (-3,4)

 $(x+3)^2 = -12(y-7)$

8. Vertex : (-2, 4)Directrix : x = -6

 $(y-4)^2 = 16(x+2)$

9. Vertex : (3, -3)Directrix : y = -5

 $(x-3)^2=8(y+3)$

10. Vertex : (2, -3)Focus : (-1, -3)

 $(y+3)^2 = -12(x-2)$

<u>Unit 10 – Conics – Graphing Ellipses</u>

Graph each of the following ellipses, then find the following.





5)
$$\frac{(x+3)^2}{16} + \frac{4(y-2)^2}{16} = 1$$
 6) $\frac{(x-4)^2}{4} + \frac{y^2}{25} = 1$





VERTICES:

CENTER:

FOCI:

MAJOR AXIS:

MINOR AXIS:

7)
$$\frac{(x-1)^2}{2} + \frac{(y+3)^2}{5} = 1$$



VERTICES:

CENTER:

FOCI:

MAJOR AXIS:

MINOR AXIS:

8) Label each as a circle or ellipse.

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

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

VERTICES:

CENTER:

FOCI:

MAJOR AXIS:

MINOR AXIS:

Unit 10 – Conics – Writing Equations of Ellipses

Find the standard form of the equation of each ellipse with the given conditions.

1) Foci: (-6,0), (6,0); vertices (-10,0), (10,0)

2) Foci: (0,-2), (0,2); vertices (0,-6) (0,6)

3) major axis horizontal with length 26; length of minor axis = 8; center (0,0)

4) major axis vertical with length 20; length of minor axis = 16; center (-2, 3)

5) Endpoints of major axis: (6,5) and (6, 17) Endpoints of minor axis (4,11) and (8,11)

6) Foci (0, -7) (0,7) x-intercepts: -7 and 7

Complete the square in order to write each in standard form.

7) $x^2 + 4x + y^2 + 2y = 10$ (circle)

8) $4x^2 + 2y^2 + 16x - 8y - 40 = 0$

9) $x^2 + 4y^2 + 10x - 8y + 13 = 0$

10) $9x^2 + 16y^2 - 18x + 64y - 71 = 0$

<u>Unit 10 – Conics – Graphing Hyperbolas</u>

Label each as a circle, ellipse, or hyperbola.

1) A)
$$\frac{(x-2)^2}{9} - \frac{(y-1)^2}{4} = 1$$
 b) $\frac{(x-2)^2}{99} + \frac{(y-1)^2}{4} = 1$ c) $x^2 + (y-7)^2 = 1$

Graph each hyperbola and fill in the listed information for each.





Asymptotes:

Asymptotes:

<u>Unit 10 – Conics – Writing the Equation of Hyperbolas</u>

Graph the following Hyperbolas by completing the square.

1.
$$4x^2 - 25y^2 = 100$$

2. $4y^2 - 36x^2 - 72x + 8y = 176$



Write the equation of the following hyperbolas using the given information.

3. Vertices at (-1, 3) and (5, 3) Co-vertices at (2, -2) and (2, 8) 4. Co-vertices at (-1, 0) and (1, 0) foci at (0, -2) and (0, 2)

$$\frac{(x-2)^2}{9} - \frac{(y-3)^2}{25} = 1$$

$$\frac{y^2}{3} - \frac{x^2}{1} = 2$$

Identify the type of graph given with the equation below, put it into its standard form then graph it.

5.
$$4x^{2} + 9y^{2} - 18y = 8x + 23$$

ellipse
 $(x-1)^{2} + (y-1)^{2} = 1$
 9



7.
$$x^{2} + 2x + y^{2} + 6y = 15$$

circle
 $(x+1)^{2} + (y+3)^{2} = 25$



6.
$$4y^2 - 8y - 4 = x^2 + 4x$$

hyperbola
 $(y-1)^2 - (x+2)^2 = 1$
 1



8.
$$x^{2} + 4x - 6y + 10 = 0$$

parabola
 $(x+2)^{2} = 6 (y-1)$

