

8.06 Parabolas and Circles Review

Date: _____

1. Identify the characteristics of the parabola. Graph and label all parts.

$(y - 3)^2 = 12(x + 1)$

$p = 3$

$4p = 12$
 $p = 3$

opens right

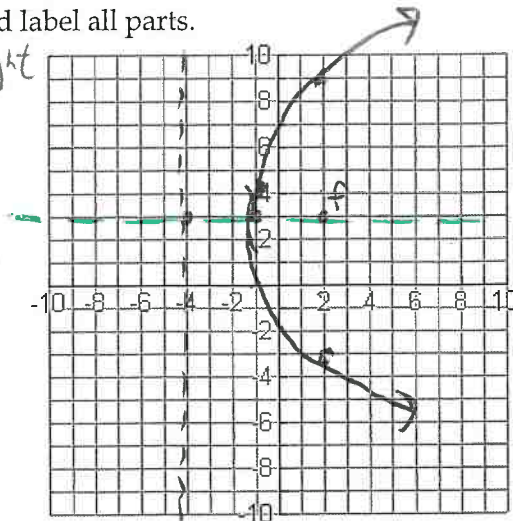
Vertex: $(-1, 3)$

Focus: $(2, 3)$

Directrix: $x = -4$

Axis of Symmetry: $y = 3$

Focal Width: 12



AOS
 $y = 3$

2. Write the equation of the parabola $x^2 - 8y - 4x + 12 = 0$ in standard form. Identify the vertex, focus, directrix, axis of symmetry, and focal width. Graph the parabola and label all parts.

Standard Form: $(x - 2)^2 = 8(y - 1)$

$(\frac{4}{2})^2 = 4$

$4p = 8$
 $p = 2$

$p = 2$

$x^2 - 4x = 8y - 12$
 $x^2 - 4x + 4 = 8y - 12 + 4$

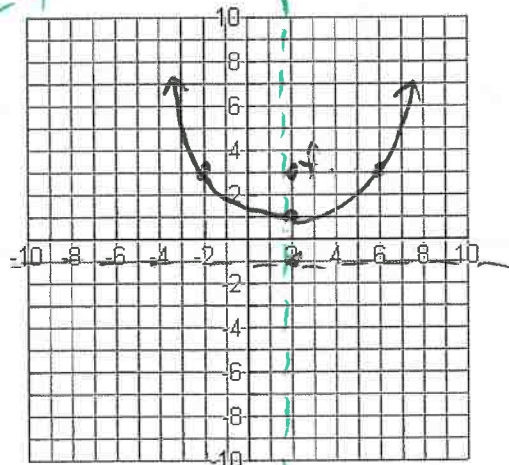
Vertex: $(2, 1)$

Focus: $(2, 3)$

Directrix: $y = -1$

Axis of Symmetry: $x = 2$

Focal Width: 8



3. Write the standard form of the equation for the parabola with a focus at $(4, 2)$ and directrix at $y = -8$. Identify its characteristics. Graph the parabola and label all parts.

Standard Form: $(x - 4)^2 = 20(y + 3)$

$p = 5$

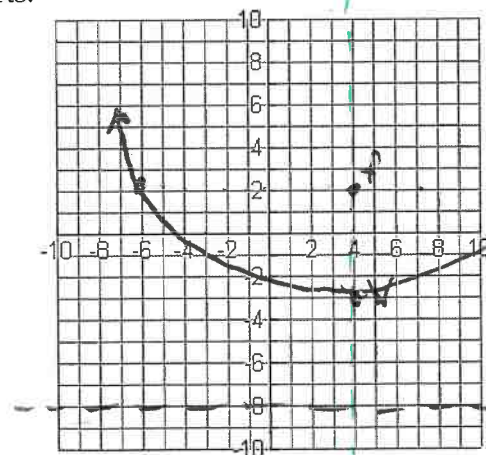
$(x - h)^2 = 4p(y - k)$

$(x - 4)^2 = 4(5)(y + 3)$

Vertex: $(4, -3)$

Directrix: $y = -8$

Axis of Symmetry: $x = 4$



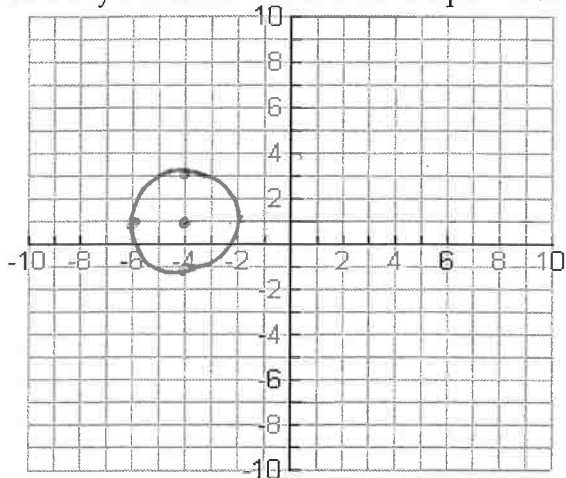
opens up
 $(x - h)^2 = 4p(y - k)$

$y = -8$

$$(x-h)^2 + (y-k)^2 = r^2$$

15

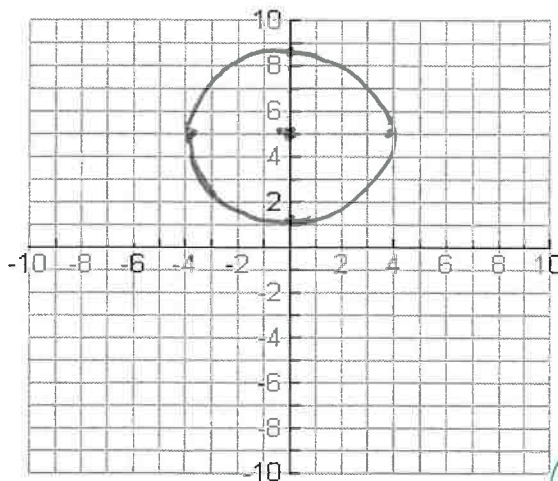
4. Use the equation $(x+4)^2 + (y-1)^2 = 4$ and identify the center and radius. Graph the circle.



$C(-4, 1)$
 $r=2$

$$\rightarrow (x-0)^2 + (y-5)^2 = \sqrt{15}^2 \rightarrow (x-0)^2 + (y-5)^2 = 15$$

5. Write the equation of a circle with center $(0, 5)$ and radius $=\sqrt{15}$. Graph the circle.

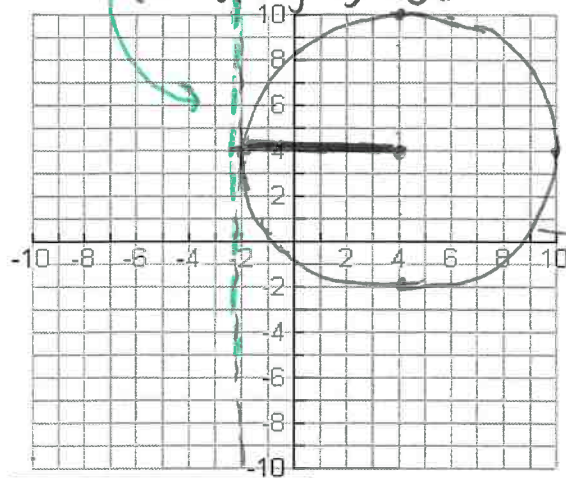


$C(0, 5)$
 $r=\sqrt{15}$

6. Given a circle with center $(4, 4)$, draw a circle that is tangent to $x = -2$, then write the equation of the circle.

$$(x-4)^2 + (y-4)^2 = 36$$

$r=6$



7. Put the equation of the circle into standard form. Identify the center and radius.

$$x^2 + y^2 - 10x - 16y + 88 = 0$$

$$x^2 - 10x + 25 + y^2 - 16y + 64 = -88 + 25 + 64$$

$$(x-5)(x-5) + (y-8)(y-8) = 1 \quad \boxed{C=(5, 8)}$$

$$(x-5)^2 + (y-8)^2 = 1 \quad \boxed{r=1}$$

$$8) (x-h)^2 + (y-k)^2 = r^2$$

$$(-3-5)^2 + (1-(-2))^2 = r^2$$

$$8^2 + 3^2 = r^2$$

$$r = \sqrt{73}$$

h k

x y

8. Find the equation of a circle whose center is at $(5, -2)$ and contains the point $(-3, 1)$.

$$(x-5)^2 + (y+2)^2 = 73$$

9)

$$8^2 + 10^2 = r^2$$

$$r^2 = 164$$

$$(x-12)^2 + (y+1)^2 = 164$$

9. Find the equation of a circle whose diameter has endpoints at $(4, 9)$ and $(20, -11)$.

Midpt: $(\frac{4+20}{2}, \frac{9-11}{2}) \rightarrow M(12, -1)$

$$(x-h)^2 + (y-k)^2 = r^2$$

$$(4-12)^2 + (9-(-1))^2 = r^2$$

10. A furniture store advertises free delivery up to a 30-mile radius from the store. Which, if any, of these customers qualifies for free delivery?

Hannah lives 7 miles north and 29 miles east of the store.

$$\sqrt{7^2 + 29^2} = r \quad r = 29.83 < 30 \checkmark$$

Anna lives 16 miles west and 24 miles north of the store.

$$r = \sqrt{16^2 + 24^2} \quad r = 28.84 < 30 \checkmark$$

Nikki lives 28 miles west and 12 miles south of the store.

$$r = \sqrt{12^2 + 28^2} \quad r = 30.463 > 30$$

no free delivery