

# Geometry CC

## Circles & Parabolas Review

Name: KEY  
Date: \_\_\_\_\_ Period: \_\_\_\_\_

1. State whether  $C(-1, 3)$  is inside, outside, or on the circle whose equation is  $x^2 + y^2 - 12x - 2y = 8$ .

$$x^2 - 12x + \underline{36} + y^2 - 2y + \underline{1} = 8 + \underline{36} + \underline{1}$$

$$(x - 6)^2 + (y - 1)^2 = 45$$

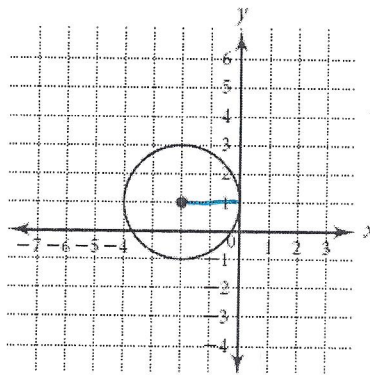
$$(-1 - 6)^2 + (3 - 1)^2 = 45 \rightarrow 53 > 45$$

Outside

2. Write the equation of the following graph in standard form.

center  $(-2, 1)$   $r=2$

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



3. Write the standard form equation for a circle with the center at  $(\frac{2}{3}, -7)$  and a radius of  $\frac{3}{4}$ .

$$(x - \frac{2}{3})^2 + (y + 7)^2 = \frac{9}{16}$$

4. Find the center and radius of the circle  $x^2 + y^2 - 2x + 2y - 7 = 0$ .

$$x^2 - 2x + \underline{1} + y^2 + 2y + \underline{1} = 7 + \underline{1} + \underline{1}$$

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

$\downarrow$   
 $r^2 = 9, \text{ so } r = 3$

Center:  $(1, -1)$

Radius:  $r = 3$

5. A circle has a *diameter* with endpoints of  $(-4, 5)$  and  $(6, 5)$ . (Graph is optional)

- a) Find the center and radius of the circle

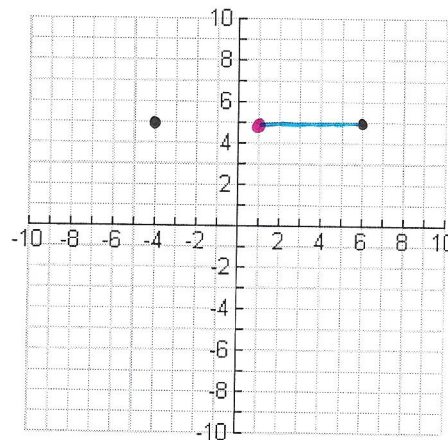
$$\text{center } (\frac{-4+6}{2}, \frac{5+5}{2}) = (1, 5)$$

$$r = \sqrt{(1-6)^2 + (5-5)^2}$$

$$r = \sqrt{25} = 5$$

- b) Write the equation for the circle.

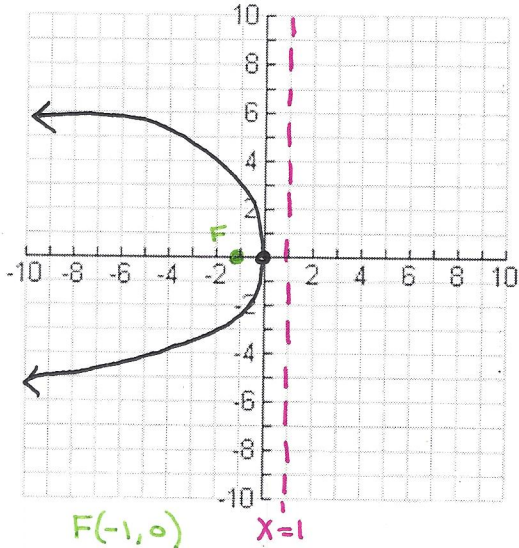
$$(x - 1)^2 + (y - 5)^2 = 25$$



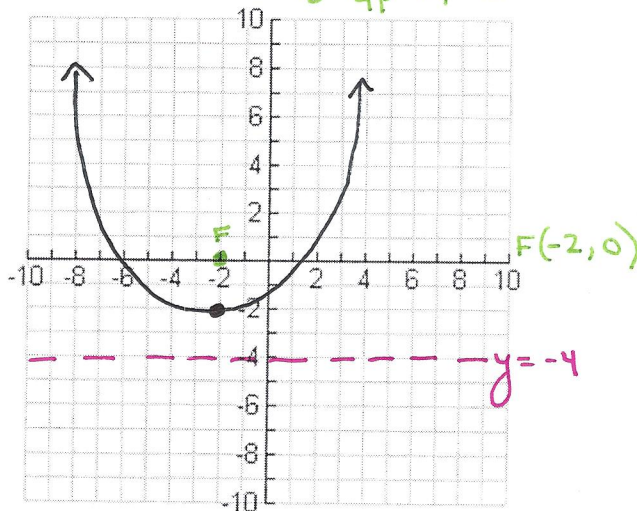
Midpoint:  $MP = (\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2})$   
Distance:  $d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$   
Circle:  $(x-h)^2 + (y-k)^2 = r^2$   
Horizontal Directrix:  $y - k = \frac{1}{4p}(x-h)^2$   
Vertical Directrix:  $x - h = \frac{1}{4p}(y-k)^2$

Graph each equation. Label the vertex, focus, and directrix.

6.  $x = -\frac{1}{4}y^2$  Vertical Directrix  $x=1$  or  $x=1$   
 $v(0,0)$   
 $-\frac{1}{4} = \frac{1}{4p} \rightarrow p = -1$



7.  $y+2 = \frac{1}{8}(x+2)^2$  Horizontal Directrix  $y=-4$  or  $y=-4$   
 $v(-2,-2)$   
 $\frac{1}{8} = \frac{1}{4p} \rightarrow p = 2$

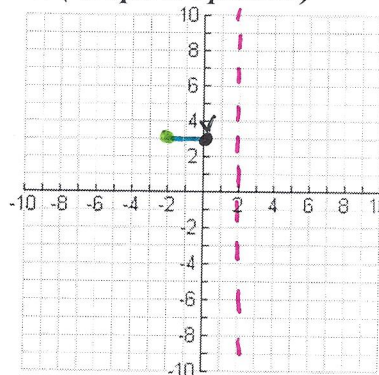


Write the standard equation for a parabola with the given characteristics. (Graph is optional)

8. focus:  $(-2, 3)$ , directrix:  $x = 2$

$v(h,k)$   
 $p = -2$

$x-h = \frac{1}{4p}(y-k)^2$   
 $x-0 = \frac{1}{-8}(y-3)^2$   
 $\rightarrow x = -\frac{1}{8}(y-3)^2$



9. Write the equation of the parabola in standard form:  $3x^2 - 30x - 18x + 87 = 0$ . Identify the vertex.

$3x^2 - 18x = 30y - 87$   
 $3(x^2 - 6x + 9) = 30y - 87 + 3(9)$   
 $\frac{3(x-3)^2}{30} = \frac{30y-60}{30}$   
 $\downarrow$   
 $\frac{1}{10}(x-3)^2 = y-2 \rightarrow y-2 = \frac{1}{10}(x-3)^2$   
 $v(3,2)$

Look over everything you have to be prepared for this test! Don't just stop at this review.