Name: Mr. Young -Rubric Date: 2/3/2014 Prd: 1/2/3

HW #3/4: Shifted Parabolas, Circles, Ellipses

Parabolas: Equation for a parabola where (h, k) is the vertex.
$(x - h)^2 = 4p(y - k)$

CIRCLES: Equation for a circle: where (h, k) is the center.
$(x - h)^2 + (y - k)^2 = r^2$

PART 1: Shifted Parabolas-

Find the vertex, focus, and directrix of the parabola and sketch the graph.

1.) $(x - 3)^2 = 8(y + 1)$

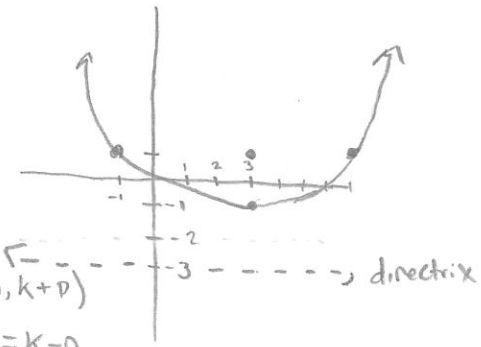
$\boxed{V: (3, -1)}$

Focus: $\frac{4p}{4} = \frac{8}{4}$

$p = 2$

$\boxed{F: (3, 1)}$; $(h, k+p)$

$\boxed{D: y = -3}$; $y = k - p$



2.) $x^2 + 10x = -6y - 13$

$x^2 + 10x + 25 = -6y - 13 + 25$ Compl. the square

$-6y + 12$

$(x + 5)^2 = -6(y - 2)$

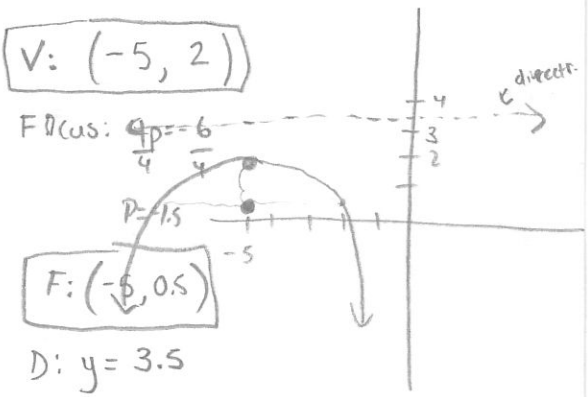
$\boxed{V: (-5, 2)}$

Focus: $\frac{4p}{4} = \frac{6}{4}$

$p = -1.5$

$\boxed{F: (-5, 0.5)}$

$D: y = 3.5$



PART 2: CIRCLES: Find the radius and center of each circle from the equation given.

1.) $x^2 + y^2 = 64$

$\boxed{C: (0, 0) \quad r = \sqrt{64} = 8}$

2.) $(x - 5)^2 + (y + 2)^2 = 64$

$\boxed{C: (5, -2) \quad R = 8}$

Name:_____ Date:_____ Prd:_____

3.) $x^2 + y^2 - 4x + 10y + 13 = 0$

$x^2 - 4x + 4 + y^2 + 10y + 25 = -13 + 25 + 4$

$(x-2)^2 + (y+5)^2 = 16$

$\boxed{\begin{array}{l} C: (2, -5) \\ R: 4 \end{array}}$

4.) $x^2 + y^2 + 6y + 2 = 0$

$x^2 + y^2 + 6y + 9 = -2 + 9$

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

$\boxed{\begin{array}{l} C: (0, -3) \\ R: \sqrt{7} \end{array}}$

5.) Write an equation of the circle described below

a.) The center is (3, 4) and the circle passes through (9, 4).

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

$(9-3)^2 + (4-4)^2 = r^2$

$36 + 0 = r^2$

$r^2 = 36$

$\boxed{(x-3)^2 + (y-4)^2 = 36}$

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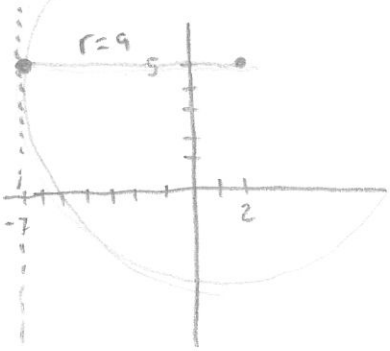
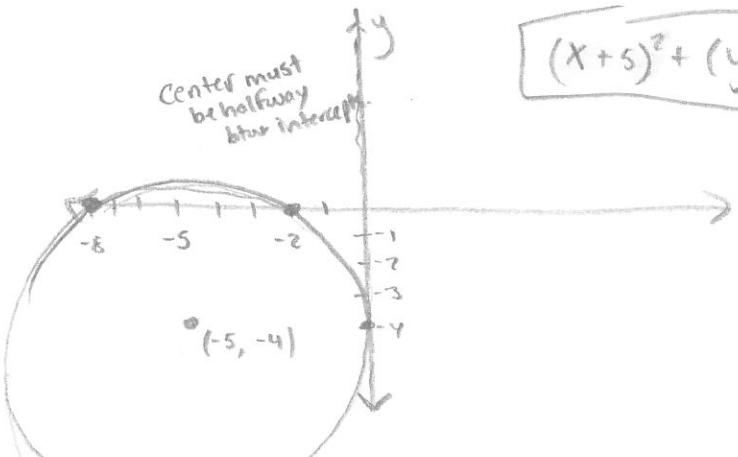
b.) The center is (2, 5) and the circle is tangent to the line x=-7.



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

$\boxed{(x-2)^2+(y-5)^2=81}$

c.) The circle is tangent to the y-axis at (0,-4) and has x-intercepts at -2 and -8.



$\boxed{(x+5)^2+(y+4)^2=25}$

6.) Graph the equations $x+y=23$ and $x^2+y^2=289$. Find the coordinates of intersection by solving the equations simultaneously (i.e. find the solution to the system or equations algebraically).

$x=23-y$

$(23-y)^2+y^2=289$

$529-46y+y^2+y^2=289$

$2y^2-46y+529=289$
$\quad\quad\quad -289 \quad -289$

$2y^2-46y+240=0$

$2(y^2-23y+120)=0$

$2(y-15)(y-8)=0$

$y=15$ and $y=8$

$x+15=23$ $\quad$ $x+8=23$

$x=8$ $\quad$ $x=15$

$\boxed{(8,15) \quad (15,8)}$