Honors Algebra II/Trig
Unit 9 Final Review

Name: Key

1. Classify each conic.

$2x^2 - 4y^2 + 15x - 12 = 0$ hyperbola
$4x^2 + 4y^2 + 5x - 12 = 0$ circle
$x^2 - 5x + y - 12 = 0$ parabola

2. Find the points where these conics intersect.

$5(16x^2 - 5y^2 = 64)$
$16x^2 + 25y^2 - 96x = 256$
$80x^2 - 25y^2 = 320$
$96x^2 - 96x = 576$
$96x^2 - 96x - 576 = 0$
$96(x^2 - x - 6) = 0$
$(x-3)(x+2) = 0$
$x = 3, -2$

$16(3)^2 - 5y^2 = 64$
$144 - 5y^2 = 64$
$-5y^2 = -80$
$y^2 = 16$
$y = \pm 4$
$16(-2)^2 - 5y^2 = 64$
$64 - 5y^2 = 64$
$-5y^2 = 0$
$y = 0$

(3,4) (-2,0)
(3,-4)

3. Find the points where these conics intersect.

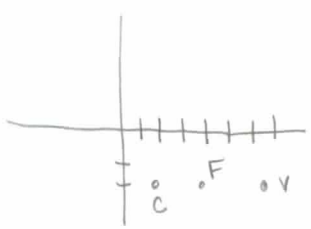
$y = x^2 + 8x + 9$
$x - y = -3$
$x + 3 = y$

$x + 3 = x^2 + 8x + 9$
$0 = x^2 + 7x + 6$
$0 = (x+6)(x+1)$
$x = -6, -1$

$y = -6 + 3$
$y = -3$
$y = -1 + 3$
$y = 2$

(-6,-3)
(-1,2)

4. Write the equation of the ellipse with a center at (2,-2) vertex at (7,-2) and focus at (4,-2).



$\frac{(x-2)^2}{25} + \frac{(y+2)^2}{21} = 1$

$25 - (ry)^2 = 4$
$21 = (ry)^2$

5. For each point in a set of points, its distance from (3,4) is four times its distance from (-5,2).

a. Find the equation.

b. Tell which conic section the graph will be.

$0 = 15x^2 + 15y^2 + 166x - 56y + 439$

circle

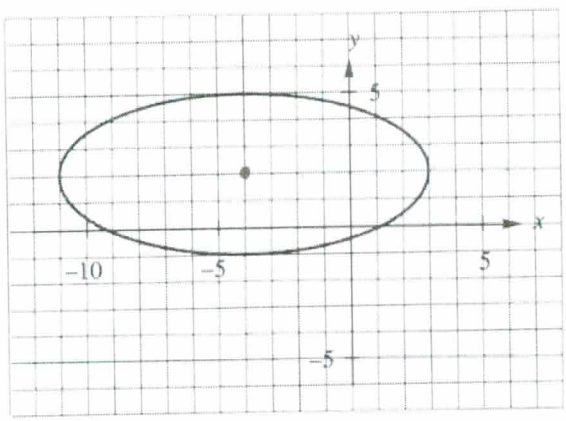
$$\sqrt{(x-3)^2 + (y-4)^2}^2 = \left(4\sqrt{(x+5)^2 + (y-2)^2}\right)^2$$

$$(x-3)^2 + (y-4)^2 = 16\left[(x+5)^2 + (y-2)^2\right]$$

$$x^2 - 6x + 9 + y^2 - 8y + 16 = 16(x^2 + 10x + 25 + y^2 - 4y + 4)$$

$$x^2 - 6x + 9 + y^2 - 8y + 16 = 16x^2 + 160x + 400 + 16y^2 - 64y + 64$$

6. Write the particular equation of this ellipse.



c(-4,2)

$$\frac{(x+4)^2}{49} + \frac{(y-2)^2}{9} = 1$$

7. A bridge is built in the shape of a semielliptical arch. The bridge has a span of 60 feet and a maximum height of 20 feet. Find the height of the arch at distances of 5,10, and 20 feet from the center.

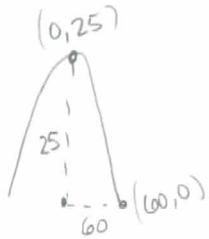
$$\frac{(x)^2}{30^2} + \frac{(y)^2}{20^2} = 1$$

5ft 19.72ft

10ft 18.86ft

20ft 14.91ft

8. A bridge is built in the shape of a parabolic arch (opening down). The bridge has a span of 120 feet and a maximum height of 25 feet. Find the height of the arch at 30 feet from the center.



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

$4p(y-25) = x^2$

$4p(-25) = (60)^2$

$-100p = 3600$

$p = -36$

$-144(y-25) = x^2$

$-144(y-25) = 30^2$

$y = 18.75$ ft