HA2T

Unit 9 Review Worksheet

Name: Key

1. Find the points where these conics intersect.

$5(16x^2 - 5y^2 = 64)$

$16x^2 + 25y^2 - 96x = 256$

$80x^2 - 25y^2 = 320$

$96x^2 - 96x - 576 = 0$

$96(x^2 - x - 6) = 0$

$(x-3)(x+2) = 0$

$x = 3, -2$

$16(3)^2 - 5y^2 = 64$

$144 - 5y^2 = 64$

$-5y^2 = -80$

$y^2 = 16$

$y = \pm 4$

$16(-2)^2 - 5y^2 = 64$

$64 - 5y^2 = 64$

$-5y^2 = 0$

$y = 0$

$\boxed{(3,4)\ (3,-4)\ (-2,0)}$

2. Find the points where these conics intersect.

$3x^2 - y^2 + 30x + 6y = -63$

$x - y = -7$

$x = y - 7$

$3(y-7)^2 - y^2 + 30(y-7) + 6y = -63$

$3(y^2 - 14y + 49)$

$3y^2 - 42y + 147 - y^2 + 30y - 210 + 6y + 63 = 0$

$2y^2 - 6y = 0$

$2y(y-3) = 0$

$y = 0, 3$

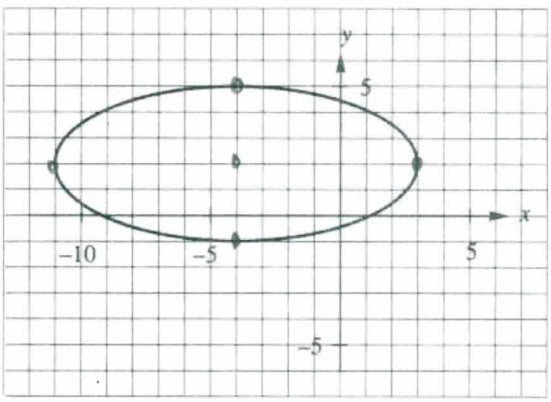
$\boxed{(-7,0)\ (-4,3)}$

(x, y)

3. 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.

$$\sqrt{(x-3)^2+(y-4)^2} = 4\sqrt{(x+5)^2+(y-2)^2}$$
$$(x-3)^2+(y-4)^2 = 16[(x+5)^2+(y-2)^2]$$
$$x^2-6x+9+y^2-8y+16 = 16(x^2+10x+25+y^2-4y+4)$$
$$x^2-6x+y^2-8y+25 = 16x^2+160x+400+16y^2-64y+64$$
$$\boxed{0 = 15x^2+166x+15y^2-56y+439 \quad \text{circle}}$$

4. Write the particular equation of this ellipse.



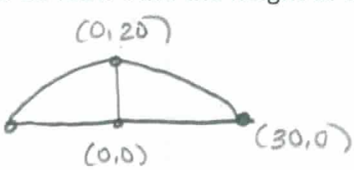
center $(-4, 2)$

$r_x = 7$

$r_y = 3$

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

5. 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.



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

$$\frac{5^2}{30^2} + \frac{y^2}{20^2} = 1$$

$$y^2 = 388.89$$

5 feet from center $\boxed{y = 19.72 \text{ ft}}$

$$\frac{10^2}{30^2} + \frac{y^2}{20^2} = 1$$

$$y^2 = 355.56$$

$\boxed{y = 18.86 \text{ ft}}$ 10 ft from center

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

$$y^2 = 222.22$$

$\boxed{y = 14.91 \text{ ft}}$ 20 ft from center