

1. Classify each conic.

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

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

$x^2 - 5x + y - 12 = 0$  parabola

2. Find the points where these conics intersect.

$x^2 + y^2 = 13$

$-(x^2 - y = 7)$

$y^2 + y = 6$

$y^2 + y - 6 = 0$

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

$y = -3, 2$

$x^2 + 3 = 7$

$x^2 = 4$

$x = \pm 2$

$x^2 - 2 = 7$

$x^2 = 9$

$x = \pm 3$

$(2, -3)$	$(3, 2)$
$(-2, -3)$	$(-3, 2)$

3. For each point in a set of points, its distance from  $(0,3)$  is  $\frac{3}{2}$  times its distance from the line  $y=-3$ .

- a. Find the equation.
- b. Tell which conic section the graph will be.

$\sqrt{(x-0)^2 + (y-3)^2} = \frac{3}{2} \sqrt{(y+3)^2}$

$x^2 + (y-3)^2 = \frac{9}{4} (y+3)^2$

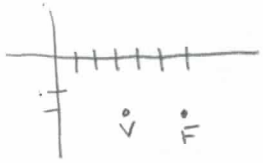
$4(x^2 + y^2 - 6y + 9) = 9(y^2 + 6y + 9)$

$4x^2 + 4y^2 - 24y + 36 = 9y^2 + 54y + 81$

$4x^2 - 5y^2 - 78y - 45 = 0$

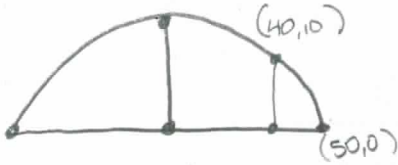
hyperbola

4. Write the equation of a parabola with a vertex at (4,-2) and a focus at (6,-2).



$$(y+2)^2 = 8(x-4)$$

5. A bridge is to be built in the shape of a ~~parabolic~~ <sup>semielliptical</sup> arch and is to have a span of 100 feet. The height of the arch 40 feet from the center must be 10 feet. Find the height of the arch at its center.



$$\frac{x^2}{50^2} + \frac{y^2}{(r_y)^2} = 1$$

$$\frac{40^2}{50^2} + \frac{10^2}{(r_y)^2} = 1$$

$$(r_y)^2 = 277.78$$

$r_y = 16.67 \text{ ft}$

For #6 and 7, sketch the graph. Find and label any asymptotes, center, foci (x,y), vertices, endpoints, radius, x-intercept, and y-intercept, if it applies.

6.  $4x = y^2 - 8y - 4$

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

$$+16 \quad +16$$

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$$4x + 20 = (y - 4)^2$$

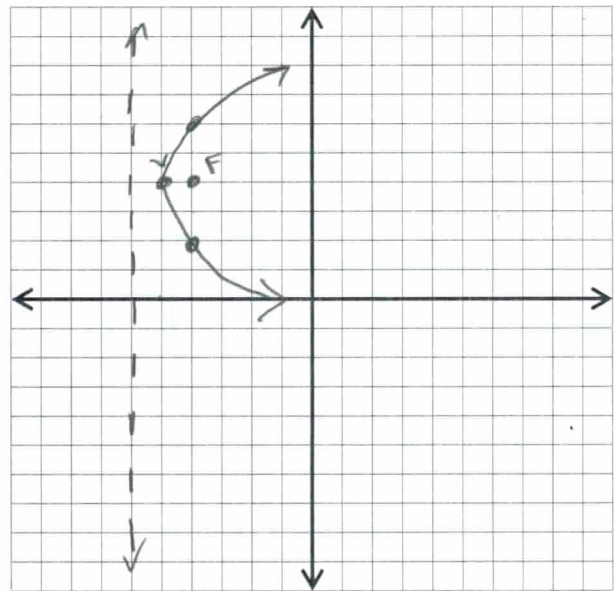
$$4(x + 5) = (y - 4)^2$$

vertex (-5, 4)

$p = 1$

focus (-4, 4)

directrix  $x = -6$



7.  $x^2 - 9y^2 + 36y = 72$

$$x^2 - 9(y^2 - 4y) = 72$$

$$+4 \quad -36$$

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$$x^2 - 9(y - 2)^2 = 36$$

$v(6, 2)(-6, 2)$

$E(0, 0)(0, 4)$

$F(\sqrt{40}, 2)$

$(-\sqrt{40}, 2)$

$$\frac{x^2}{36} - \frac{(y-2)^2}{4} = 1$$

center (0, 2)

$r_x = 6$

$r_y = \sqrt{40}$

$y - 2 = \pm \frac{1}{3}x$

