

PRECALCULUS ADVANCED
REVIEW OF 10.2-10.4

For each of the following, find the indicated information, and graph.

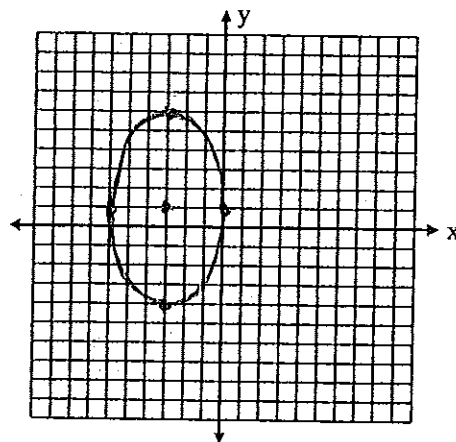
1. $\frac{(x+3)^2}{9} + \frac{(y-1)^2}{25} = 1$ $a=5$
 $b=3$
 $c=\sqrt{16}=4$

Center = $(-3, 1)$

Vertices = $(-3, 6)(-3, -4)$

Foci = $(-3, 5)(-3, -3)$

Eccentricity = $\frac{4}{5}$



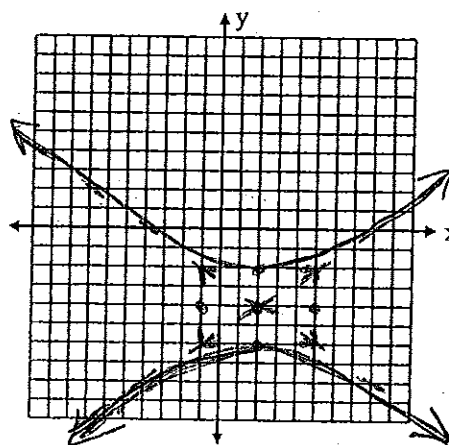
2. $\frac{(y+4)^2}{4} - \frac{(x-2)^2}{9} = 1$ $a=2$
 $b=3$
 $c=\sqrt{13}$

Center = $(2, -4)$

Vertices = $(2, -2)(2, -6)$

Foci = $(2, -4+\sqrt{13})(2, -4-\sqrt{13})$

Asymptotes: $y+4 = \pm \frac{2}{3}(x-2)$



3. $(y-3)^2 = 8(x-5)$ $c=2$

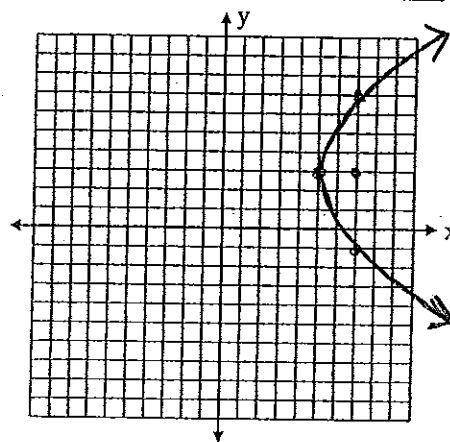
Vertex = $(5, 3)$

Focus = $(7, 3)$

Equation of directrix: $x=3$

Equation of axis of symmetry: $y=3$

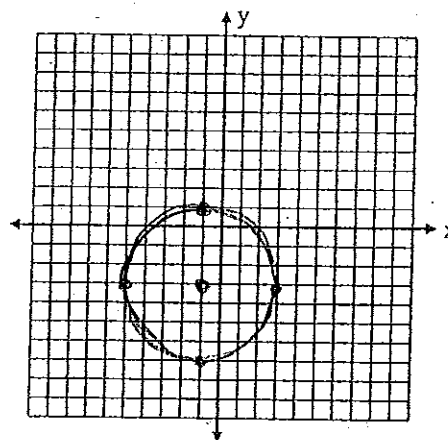
Endpoints of Latus Rectum = $(7, 7)(7, -1)$



4. $(x+1)^2 + (y+3)^2 = 16$

Center = $(-1, -3)$

Radius = 4



Write an equation from the given information.

5. Circle with center $(-8, 12)$ and passes through $(-2, 4)$

$$r = \sqrt{(-2 - (-8))^2 + (4 - 12)^2}$$

$$= \sqrt{36 + 64}$$

$$= \sqrt{100}$$

$$= 10$$

$$(x + 8)^2 + (y - 12)^2 = 100$$

6. Ellipse with foci $(0, 5)$ and $(12, 5)$ and minor axis of length 8

$c(6, 5)$ $c = 6$ $b = 4$ $a^2 - 4^2 = 6^2$ Horizontal
 $a^2 = 36 + 16 = 52$

$$\frac{(x - 6)^2}{52} + \frac{(y - 5)^2}{16} = 1$$

7. Hyperbola with center at $(3, 5)$, a vertex at $(3, -1)$, and asymptotes $y - 5 = \pm \frac{3}{4}(x - 3)$

Vertical $a = 6$ $b = 8$

$$\frac{(y - 5)^2}{36} - \frac{(x - 3)^2}{64} = 1$$

Write in standard form, and identify.

8. $x^2 + y^2 - 8y + 16 = 9$

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

Circle
 $C(0, 4)$
 $r = 3$

9. $x^2 - 8x - 6y + 4 = 0$

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

$$x^2 - 8x + 16 = 6y - 4 + 16$$

$$(x - 4)^2 = 6y + 12$$

$$(x - 4)^2 = 6(y + 2) \quad c = \frac{6}{4} = \frac{3}{2}$$

V. Parabola
 $V(4, -2)$ $F(4, -\frac{1}{2})$
 axis $x = 4$ directrix $y = -3\frac{1}{2}$

10. $x^2 + 2y^2 - 4x + 8y + 10 = 0$

$$x^2 - 4x + 2y^2 + 8y = -10$$

$$(x^2 - 4x + 4) + 2(y^2 + 4y + 4) = -10 + 4 + 8$$

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

$$\frac{(x - 2)^2}{2} + \frac{(y + 2)^2}{1} = 1 \quad a = \sqrt{2}$$

$$b = 1$$

$$c = 1$$

H. Ellipse
 $C(2, -2)$ $V(2 \pm \sqrt{2}, -2)$ $F(3, -2)$ $(1, -2)$

11. $x^2 + y^2 - 8y + 4 = 0$

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

$$x^2 + (y^2 - 8y + 16) = -4 + 16$$

$$x^2 + (y - 4)^2 = 12$$

Circle
 $C(0, 4)$
 $r = \sqrt{12}$