

Warm-up (Conic Sections Review)

Name: Answer Key*

1) Put in standard form:

$$x^2 + 4x + 3y^2 - 5 = 0$$

Find vertices and foci.

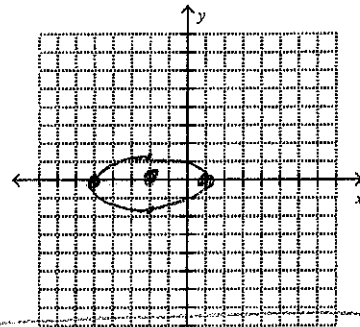
$$x^2 + 4x + \left(\frac{4}{2}\right)^2 + 3(y^2) = 5 + \left(\frac{4}{2}\right)^2$$

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

$$\frac{(x+2)^2}{9} + \frac{y^2}{3} = 1$$

ellipse

horizontal



center $(-2, 0)$

$$a = 3$$

$$b = \sqrt{3}$$

$$a^2 = b^2 + c^2$$

$$3^2 = (\sqrt{3})^2 + c^2$$

$$c = \sqrt{6}$$

Vertices $(1, 0)$ & $(-5, 0)$

foci $(-2 \pm \sqrt{6}, 0)$

2) $(x - 1)^2 = 12(y + 3)$

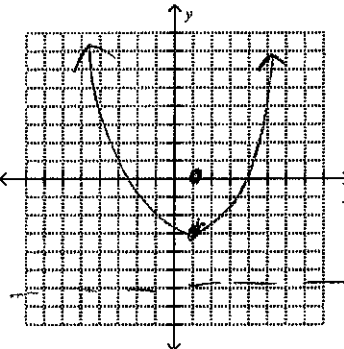
Find the vertex, focus & directrix.

$$12 = 4p$$

$$p = 3$$

vertex $(1, -3)$

up
 $x^2 \oplus$



parabola

focus $(1, 0)$

directrix: $y = -6$

slopes = $\pm \frac{3}{2}$

foci $(2 \pm \sqrt{13}, 1)$

3) $9x^2 - 4y^2 - 36x + 8y - 4 = 0$

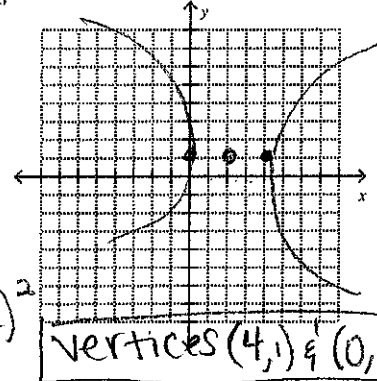
Find the center, vertices, slopes of asymptotes & foci.

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

$$9(x-2)^2 - 4(y-1)^2 = 36$$

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

hyperbola



center $(2, 1)$

horizontal

$$a = 2, b = 3$$

$$c^2 = a^2 + b^2$$

$$c^2 = 2^2 + 3^2$$

$$c = \sqrt{13}$$

Vertices $(4, 1)$ & $(0, 1)$

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

Find the center and radius.

center $(-3, 2)$

radius = 2

circle

