Parabolas and Hyperbolas Review # 2

Directions: Circle the name that correctly identifies what type of conic each equation represents.

1. $2x^2 - 8y - 8x + 7 + y^2 = -2$ Circle (Ellipse) Hyperbola Parabola

2. $4x^2 + 8x - 100y = -16 + 2y^2$ Circle Ellipse (Hyperbola) Parabola

$-2y^2 \qquad -2y^2$

$4x^2 - 2y^2$

Graph the following. Then identify the vertex, focus, and directrix.

3. $y = -\frac{1}{12}(x-3)^2 + 4$

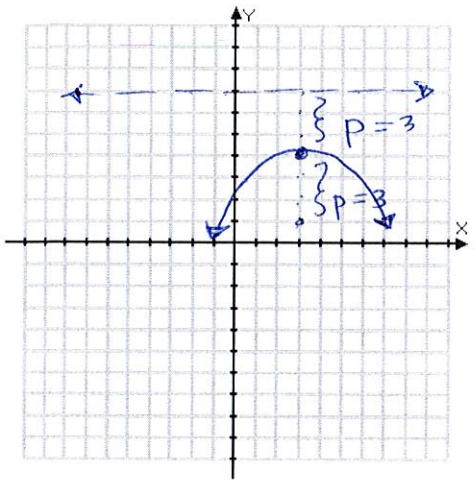
vertical

opens DOWNWARD

Vertex:	$(3,4)$ (+3)
Focus:	$(3,1)$ (−3)
Directrix:	$y = 7$

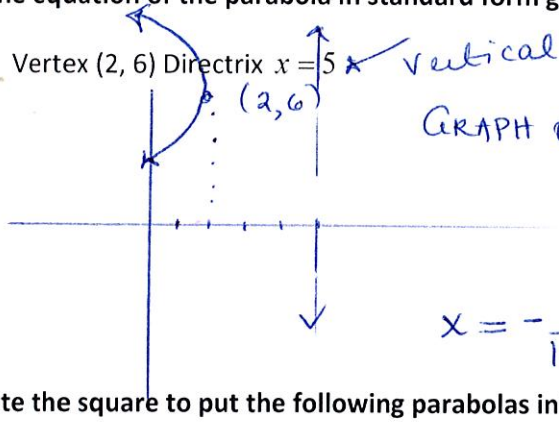
$4p = 12$

$p = 3$



Write the equation of the parabola in standard form given the following information.

4. Vertex (2, 6) Directrix $x = 5$



vertical line that passes through 5 on x-axis

GRAPH OPENS AWAY from directrix

∴ left

→ equation must be of the form $x = y^2$

$x = -\frac{1}{12}(y-6)^2 + 2$

Complete the square to put the following parabolas into standard form.

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

$-8y = -x^2 - 6x - 9$

$8y = x^2 + 6x + 9$

$8y = (x+3)^2$

$y = \frac{1}{8}(x+3)^2$

← it's not necessary to add anything as x^2+6x+9 is a "perfect square trinomial"

Graph the following. Then identify the center, vertices, and foci for each.

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

$a = 3$

$b = 2$

$c^2 = 9+4$

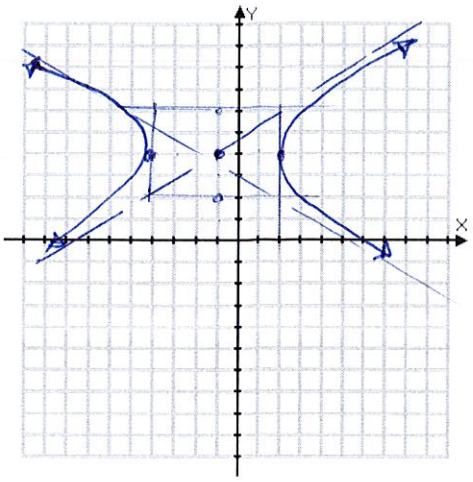
$c^2 = 13$

$c = \sqrt{13}$

Center: $(-1, 4)$

Vertices: $(2, 4)$ $(-4, 4)$

Foci: $(-1 \pm \sqrt{13}, 4)$



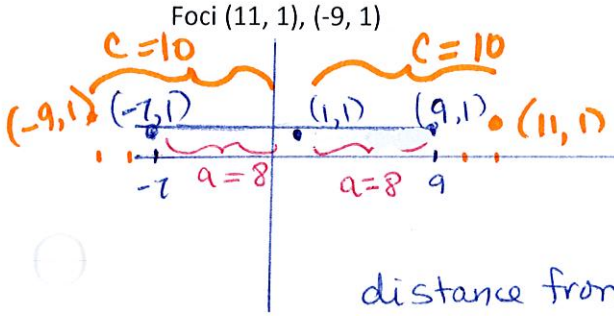
Vertices: $(-1 \pm 3, 4)$

Foci: $(-1 \pm \sqrt{13}, 4)$

Curves open to the left & right

Write the equation of the hyperbola in standard form given the following information.

7. Vertices (9, 1), (-7,1)
Foci (11, 1), (-9, 1)



center is midpoint of vertices

$\left(\frac{9+-7}{2}, \frac{1+1}{2}\right)$

$\left(\frac{2}{2}, \frac{2}{2}\right)$

$(1, 1)$

x must lead!

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

$64 = a^2$ $\quad 36 = b^2$

distance from center to each vertex: $a = 8$

distance from center to each focus: $c = 10$

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

$8^2 + b^2 = 10^2$

$64 + b^2 = 100$

$b^2 = 36$

Complete the square to put the following hyperbolas into standard form.

8. $9x^2 - 4y^2 - 90x + 32y - 163 = 0$

$9x^2 - 90x - 4y^2 + 32y = 163$

$9(x^2 - 10x + \_\_) - 4(y^2 - 8y + \_\_) = 163 + \_\_ + \_\_$

factor out negative coefficient

for hyperbola, there will always be a sign change

$9(x^2 - 10x + \underline{25}) - 4(y^2 - 8y + \underline{16}) = 163 + \underline{225} + \underline{-64}$

(9·25) (-4·16)

$9(x-5)^2 - 4(y-4)^2 = 324$

$\frac{(x-5)^2}{36} - \frac{(y-4)^2}{81} = 1$