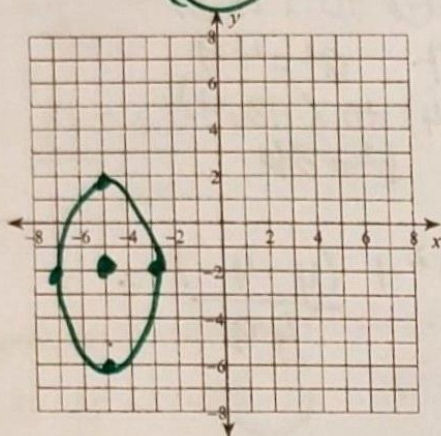


Review for Quiz #3

Identify the following characteristics listed. Then sketch the graph.

"a²" is bigger

1) $\frac{(x+5)^2}{4} + \frac{(y+2)^2}{16} = 1$



$a^2 = 16$ $a = 4$

$b^2 = 4$ $b = 2$

Center: $(-5, -2)$

Major Axis: y

Vertices: $(-5, 2)$ & $(-5, -6)$

Co-vertices: $(-3, -2)$ & $(-7, -2)$

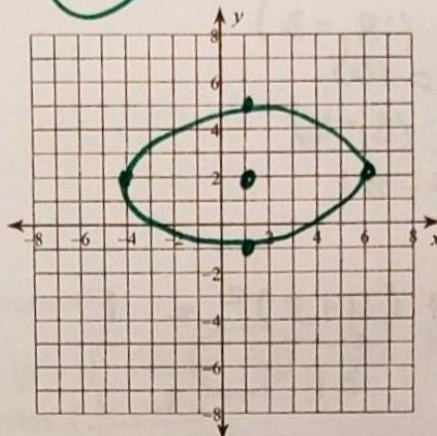
Foci: $c^2 = a^2 - b^2$

$\sqrt{c^2} = \sqrt{16-4}$
 $c = \pm \sqrt{12}$

Foci Points:

$(-5, -2 \pm \sqrt{12})$

2) $\frac{(x-1)^2}{25} + \frac{(y-2)^2}{9} = 1$



$a^2 = 25$ $a = 5$

$b^2 = 9$ $b = 3$

Center: $(1, 2)$

Major Axis: x

Vertices: $(6, 2)$ & $(-4, 2)$

Co-vertices: $(1, 5)$ & $(1, -1)$

Foci: $c^2 = a^2 - b^2$

$\sqrt{c^2} = \sqrt{25-9}$
 $c = \pm 4$

Foci Points:

$(1 \pm 4, 2)$

$(5, 2), (-3, 2)$

Use the information provided to write the standard form equation of each ellipse.

- 3) Vertices: $(18, -3)$, $(-2, -3)$
 Co-vertices: $(8, 6)$, $(8, -12)$

Step 1: Center: $\left(\frac{18+(-2)}{2}, \frac{-3+(-3)}{2}\right) = (8, -3)$

Step 2: $a = (8, -3)$ to $(18, -3)$
 $a = 10$ $a^2 = 100$

Step 3: $b = (8, -3)$ to $(8, -12)$
 $b = -9$ $b^2 = 81$

Step 4: Equation:

$$\frac{(x-8)^2}{100} + \frac{(y+3)^2}{81} = 1$$

- 4) Vertices: $(7, 11)$, $(7, -3)$
 Co-vertices: $(13, 4)$, $(1, 4)$

Step 1: Center: $(7, 4)$

Step 2: $a = (7, 4)$ to $(7, 11)$
 $a = 7$ $a^2 = 49$

Step 3: $b = (7, 4)$ to $(13, 4)$
 $b = 6$ $b^2 = 36$

Step 4: Equation:

$$\frac{(x-7)^2}{36} + \frac{(y-4)^2}{49} = 1$$

Use the information provided to write the standard form equation of each hyperbola.

- 5) Vertices: $(-9, 1)$, $(-9, -13)$
 Foci: $(-9, 12)$, $(-9, -14)$

Step 1: transverse axis: y

Step 2: Center: $(-9, -1)$

Step 3: $a = (-9, -1)$ to $(-9, -13)$
 $a = 12$ $a^2 = 144$

Step 4: $c = (-9, -1)$ to $(-9, -14)$
 $c = -13$ $c^2 = 169$

Step 5: $b^2 = c^2 - a^2$
 $b^2 = 169 - 144 = 25$

Step 6: Equation:

$$\frac{(y+1)^2}{144} - \frac{(x+9)^2}{25} = 1$$

- 6) Vertices: $(-7, -1)$, $(-13, -1)$
 Foci: $(-5, -1)$, $(-15, -1)$

Step 1: transverse axis: x

Step 2: Center: $(-10, -1)$

Step 3: $a = (-10, -1)$ to $(-13, -1)$
 $a = -3$ $a^2 = 9$

Step 4: $c = (-10, -1)$ to $(-15, -1)$
 $c = -5$ $c^2 = 25$

Step 5: $b^2 = c^2 - a^2$
 $b^2 = 25 - 9 = 16$

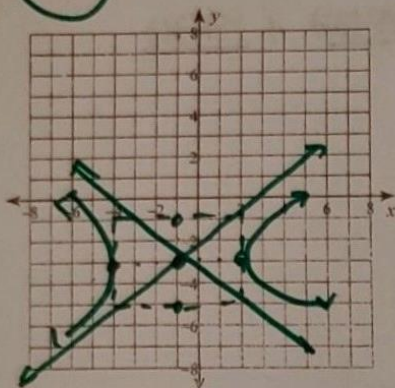
Step 6: Equation:

$$\frac{(x+10)^2}{9} - \frac{(y+1)^2}{16} = 1$$

"a" first

Identify the following characteristics listed. Then sketch the graph.

7) $\frac{(x+1)^2}{9} - \frac{(y+3)^2}{4} = 1$

Center: $(-1, -3)$

$a^2 = 9 \quad a = 3$

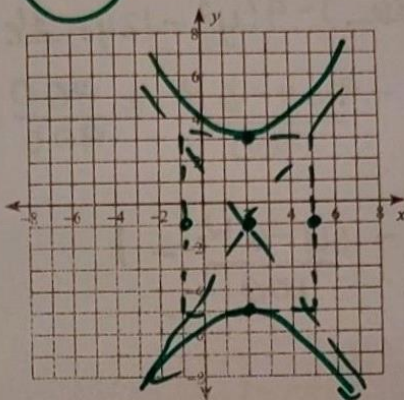
$b^2 = 4 \quad b = 2$

Transverse axis: x Vertices: $(2, -3)$ & $(-4, -3)$ Co-Vertices: $(-1, -1)$ & $(-1, -5)$

Foci Distance: $c^2 = a^2 + b^2$
 $\sqrt{c^2} = \sqrt{9+4} \quad c = \pm\sqrt{13}$

Foci Points: $(-1 \pm \sqrt{13}, -3)$

8) $\frac{(y+1)^2}{16} - \frac{(x-2)^2}{9} = 1$

Center: $(2, -1)$

$a^2 = 16 \quad a = 4$

$b^2 = 9 \quad b = 3$

Transverse axis: y Vertices: $(2, 3)$ & $(2, -5)$ Co-Vertices: $(5, -1)$ & $(-1, -1)$

Foci Distance: $c^2 = a^2 + b^2$
 $\sqrt{c^2} = \sqrt{16+9} \quad c = \pm 5$

Foci Points: $(2, -1 \pm 5)$
 $(2, -6), (2, 4)$

Write the following equations in standard form. Show all your steps.

9) $x^2 + y^2 - 24x + 24y + 263 = 0$

10) $9x^2 + y^2 + 18x - 4y - 23 = 0$

$9x^2 + 18x + \underline{\quad} + y^2 - 4y + \underline{\quad} = 23 + \underline{\quad} + \underline{\quad}$

$9(x^2 + 2x + \underline{1}) + y^2 - 4y + \underline{4} = 23 + 9(\underline{1}) + \underline{4}$

$\frac{9(x+1)^2}{36} + \frac{(y-2)^2}{36} = \frac{36}{36}$

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

$$11) 25x^2 - 9y^2 + 300x + 108y - 324 = 0$$

$$25x^2 + 300x + \underline{\quad} - 9y^2 + 108y + \underline{\quad} = 324 + \underline{\quad} + \underline{\quad}$$

$$25(x^2 + 12x + \underline{36}) - 9(y^2 - 12y + \underline{36}) = 324 + \underline{25(36)} + \underline{-9(36)}$$

$$\frac{25(x+6)^2}{900} - \frac{9(y-6)^2}{900} = \frac{900}{900}$$

$$\frac{(x+6)^2}{36} - \frac{(y-6)^2}{100} = 1$$

Identify the characteristics of the parabola. Graph the parabola.

$$12) (x+3)^2 = 4(-2)(y-3) \quad \text{U or } \cap$$

Vertex: (3, 3)

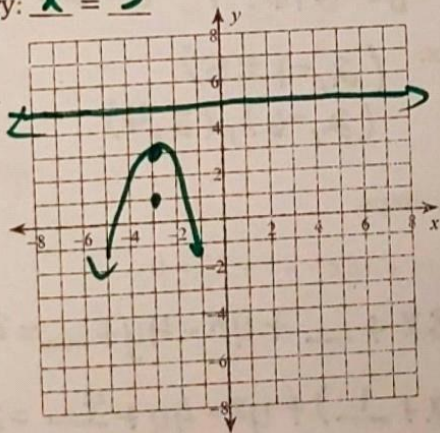
p = -2

opens down

Focus: (-1, 1)

Directrix: y = 5

Axis of Symmetry: x = -3



$$13) (y-3)^2 = 4(3)(x-1) \quad \text{C or } \curvearrowright$$

Vertex: (1, 3)

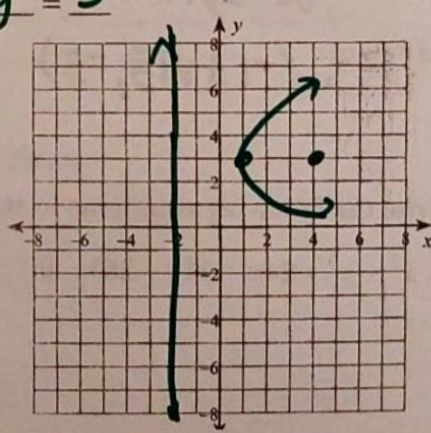
p = 3

opens right

Focus: (4, 3)

Directrix: x = -2

Axis of Symmetry: y = 3



Use the information provided to write the vertex form equation of each parabola.

14) Vertex: (-3, -7), Focus: (-2, -7)

$$(y+7)^2 = 4(1)(x+3)$$

15) Vertex: (8, 7), Focus: (8, 8)

$$(x-8)^2 = 4(1)(y-7)$$

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