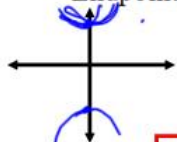


11.3 Practice - Hyperbolas

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

- 1) Vertices: (0, 14), (0, -14)

Endpoints of Conjugate Axis: (12, 0)

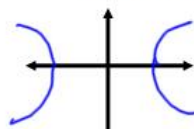


Center: (0,0)
a=14
b=12

$$\frac{y^2}{196} - \frac{x^2}{144} = 1$$

- 2) Vertices: (8, 0), (-8, 0)

Endpoints of Conjugate Axis: (0, 10)

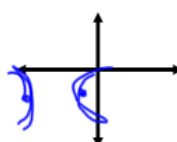


Center: (0,0)
a=8
b=10

$$\frac{x^2}{64} - \frac{y^2}{100} = 1$$

- 3) Vertices: (-1, -2), (-13, -2)

Endpoints of Conjugate Axis: (-7, 2)

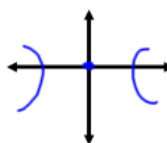


Center: (-7,-2)
a=6
b=4

$$\frac{(x+7)^2}{36} - \frac{(y+2)^2}{16} = 1$$

- 4) Center at (0, 0)

Transverse axis is horizontal; central rectangle is 10 units wide and 14 units tall

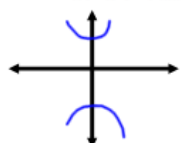


Center: (0,0)
a=5
b=7

$$\frac{x^2}{25} - \frac{y^2}{49} = 1$$

- 5) Center at (0, 0)

Transverse axis is vertical; central rectangle is 16 units wide and 4 units tall

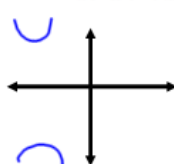


Center: (0,0)
a=2
b=8

$$\frac{y^2}{4} - \frac{x^2}{64} = 1$$

- 6) Center at (-8, -9)

Transverse axis is vertical; central rectangle is 10 units wide and 24 units tall

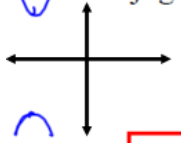


Center: (-8,-9)
a=12
b=5

$$\frac{(y+9)^2}{144} - \frac{(x+8)^2}{25} = 1$$

- 7) Vertices: (-10, 12), (-10, -14)

Conjugate Axis is 20 units long



Center: (-10,-1)
a=13
b=10

$$\frac{(y+1)^2}{169} - \frac{(x+10)^2}{100} = 1$$

- 8) Vertices: (0, -4), (-12, -4)

Conjugate Axis is 10 units long

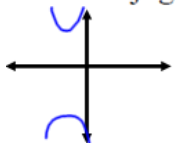


Center: (-6,-4)
a=6
b=5

$$\frac{(x+6)^2}{36} - \frac{(y+4)^2}{25} = 1$$

- 9) Vertices: (-6, 11), (-6, -9)

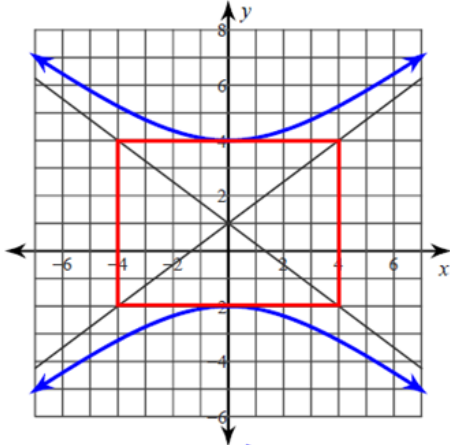
Conjugate Axis is 22 units long



Center: (-6,1)
a=10
b=11

$$\frac{(y-1)^2}{100} - \frac{(x+6)^2}{121} = 1$$

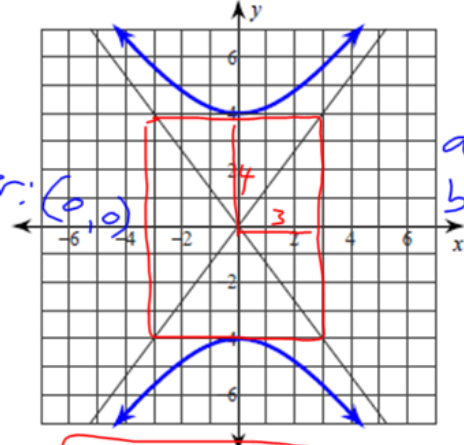
10)



Center: $(0, 1)$
 $a=3$
 $b=4$

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

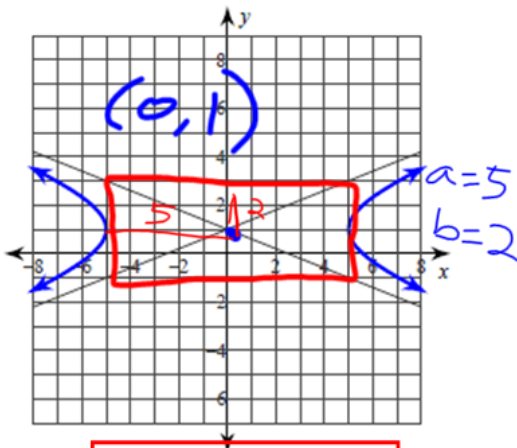
11)



Center: $(0, 0)$
 $a=4$
 $b=3$

$$\frac{y^2}{16} - \frac{x^2}{9} = 1$$

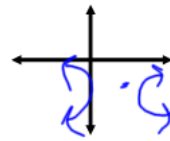
12)



$$\frac{x^2}{25} - \frac{(y-1)^2}{4} = 1$$

13) Center at $(9, -5)$

Transverse axis is horizontal; central rectangle is 8 units wide and 22 units tall

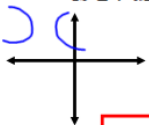


Center: $(9, -5)$
 $a=4$
 $b=11$

$$\frac{(x-9)^2}{16} - \frac{(y+5)^2}{121} = 1$$

14) Center at $(-9, 9)$

Transverse axis is horizontal; central rectangle is 24 units wide and 20 units tall

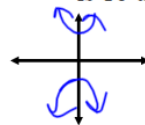


Center: $(-9, 9)$
 $a=12$
 $b=10$

$$\frac{(x+9)^2}{144} - \frac{(y-9)^2}{100} = 1$$

15) Center at $(10, 7)$

Transverse axis is vertical; central rectangle is 18 units wide and 6 units tall

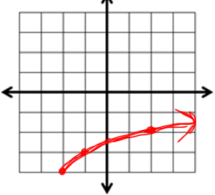


Center: $(10, 7)$
 $a=3$
 $b=9$

$$\frac{(y-7)^2}{81} - \frac{(x-10)^2}{9} = 1$$

Algebra Skills:

1. Graph $f(x) = \sqrt{x+2} - 4$.



Multiply.

2. $(2 - \sqrt{5})(2 + \sqrt{5})$
 $4 - 2\sqrt{5} - 2\sqrt{5} + 5$
 $9 - 4\sqrt{5}$

3. $(2 + \sqrt{x})(\sqrt{x} - 4)$
 $2\sqrt{x} - 8 + x - 4\sqrt{x}$
 $x - 2\sqrt{x} - 8$

Solve by factoring.

4. $3x^2 - 27x = 0$
 $3x(x^2 - 9) = 0$
 $3x(x-3)(x+3) = 0$
 $x=0, x=3, x=-3$

5. $6x^2 - 3x - 9 = 0$
 $3(2x^2 - x - 3) = 0$
 $2x^2 - 3x + 2x - 3 = 0$
 $x(2x-3) + 1(2x-3) = 0$
 $(2x-3)(x+1) = 0$
 $x = \frac{3}{2}, x = -1$

SAT Prep:

1.

Which is the equation of a hyperbola with vertices at $(0, -6)$ and $(0, 6)$ and foci at $(0, -8)$ and $(0, 8)$?

- (A) $\frac{x^2}{64} - \frac{y^2}{36} = 1$ (B) $\frac{y^2}{64} - \frac{x^2}{36} = 1$
 (C) $\frac{x^2}{36} - \frac{y^2}{28} = 1$ (D) $\frac{y^2}{36} - \frac{x^2}{28} = 1$
- $a=6$
-

2. The distance between $(-8, 8)$ and $(4, y)$ is $\sqrt{13}$. What is a positive value for y ?

$\sqrt{13} = \sqrt{(4-(-8))^2 + (y-8)^2}$
 $13 = 9 + (y-8)^2$
 $4 = (y-8)^2$
 $\pm 2 = y-8$
 $y = 3$
 $y = 10$

