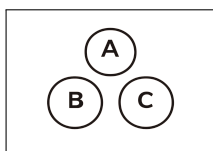


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Functions and Graphs Hyperbola

B



$$a = 4$$

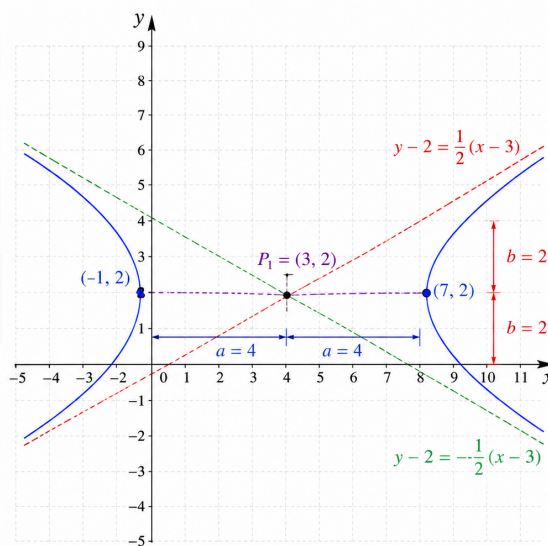
$$b = 2$$

$$P_1 = (3, 2)$$

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

$$m = \pm \frac{b}{a} = \pm \frac{2}{4} = \pm \frac{1}{2}$$

$$y - 2 = \pm \frac{1}{2}(x - 3)$$



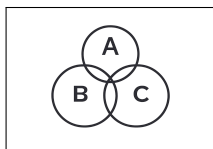
$$a = 2, b = 4$$

$$P_1 = (3, 2)$$

$$(x - 3)^2/2^2 - (y - 2)^2/4^2 = 1$$

$$m = \pm \frac{b}{a} = \pm \frac{4}{2} = \pm 2$$

$$y - 2 = \pm 2(x - 3)$$



$$(x - h)^2/b^2 - (y - h)^2/a^2 = 1$$

$$m = \pm a/b$$

$$a = 3, b = 5$$

$$P_1 = (2, 1)$$

$$1 = ?$$

$$m = ?$$

?

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Functions and Graphs Hyperbola

B



$$a = 3, b = 5$$

$$P_1 = (2, 1)$$

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

$$m = \pm \frac{3}{5}$$

$$y - 1 = \pm \frac{3}{5}(x - 2)$$

— Hyperbola

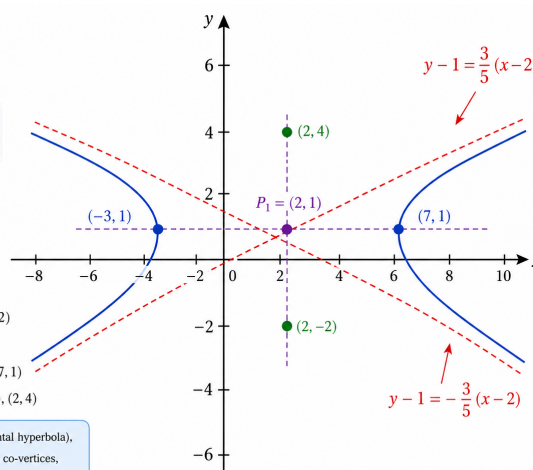
- - - Asymptotes $y - 1 = \pm \frac{3}{5}(x - 2)$

• Center $P_1 = (2, 1)$

• Vertices $(2 \pm 5, 1) = (-3, 1), (7, 1)$

• Co-vertices $(2, 1 \pm 3) = (2, -2), (2, 4)$

For $\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$ (horizontal hyperbola),
 a = distance to vertices, b = distance to co-vertices,
 asymptote slope $m = \pm \frac{b}{a}$.



$$a = 3, b = 5$$

$$P_1 = (2, 1)$$

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

$$m = \pm 3/5$$

$$y - 1 = \pm 3/5(x - 2)$$