

Answer on Question #73849 – Math – Analytic Geometry

Question

Write the equation for the hyperbola with foci (6, -5), (-4, -5) and conjugate axis of length 8?

Solution

The distance between two foci is given as $2c$. Here the distance between the points is 10, therefore $c = 5$.

Then, the length of the conjugate axis is 8. The length of the conjugate axis is $2b$ therefore the value of $b = 4$.

We know that in hyperbola $b^2 = c^2 - a^2$. Hence, $a^2 = c^2 - b^2$.

Substituting values for b and c .

$$a^2 = 25 - 16 = 9$$

As the foci for our hyperbola are (6, -5), (-4, -5), then the center is (1, -5).

Therefore equation of hyperbola is

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

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