

Answer on Question #82151 – Math – Calculus

Question

For the system shown below, what are the coordinates of the solution that lies in quadrant I?

$$\begin{aligned}3y^2 - 5x^2 &= 8 \\3y^2 - x^2 &= 24\end{aligned}$$

Write your answer in the form (a, b) without using spaces and round to the nearest integer.

Solution

I quadrant: $x > 0, y > 0$.

$$\begin{aligned}\begin{cases} 3y^2 - 5x^2 = 8 \\ 3y^2 - x^2 = 24 \end{cases} &\Rightarrow \begin{cases} 3y^2 = 5x^2 + 8 \\ 5x^2 + 8 - x^2 = 24 \end{cases} \Rightarrow \begin{cases} 3y^2 = 5x^2 + 8 \\ 4x^2 = 16 \end{cases} \Rightarrow \\ \Rightarrow \begin{cases} 3y^2 = 5(4) + 8 \\ x^2 = 4 \end{cases} &\Rightarrow \begin{cases} x^2 = 4 \\ y^2 = \frac{28}{3} \end{cases}\end{aligned}$$

Then

$$x = 2, y = \sqrt{\frac{28}{3}} \approx 3$$

Answer: it is approximately (2,3).