

AI1110-Assignment 2

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(ICSE-12-2017)Question 1

(ii) if $y - 2x - k = 0$ touches the conic $3x^2 - 5y^2 = 15$, find the value of k

Solution :

The Given conic(Hyperbola) can be written as

$$\frac{x^2}{5} - \frac{y^2}{3} = 1 \quad (0.0.1)$$

But

if a line $lx + my + n = 0$ is a tangent to hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$, Then

$$a^2l^2 - b^2m^2 = n^2 \quad (0.0.2)$$

By comparing with the given equations

$$(5)^2(2)^2 - (3)^2(1)^2 = k^2 \quad (0.0.3)$$

$$k^2 - 17 = 0 \quad (0.0.4)$$

$$k = \pm\sqrt{17} \quad (0.0.5)$$

