Question 6: If x = 9 is a solution of $\ln(x^2 + 15a^2) - \ln(a-2) = \ln(8ax/(a-2))$ then

(a) a = 3/5

(b) a = 3

(c) x = 15

(d) x = 2

Solution:

Given $\ln(x^2 + 15a^2) - \ln(a-2) = \ln(8ax/(a-2))$

$\ln[(x^2 + 15a^2)/(a-2)] = \ln(8ax/(a-2))$

$\Rightarrow (x^2 + 15a^2)/(a-2) = (8ax/(a-2))$

$\Rightarrow x^2 + 15a^2 = 8ax$

$\Rightarrow x^2 + 15a^2 - 8ax = 0$ ..(i)

Given x = 9 is a root.

$\Rightarrow 81 + 15a^2 - 72a = 0$

$\Rightarrow 5a^2 - 24a + 27 = 0$

$\Rightarrow (5a-9)(a-3) = 0$

$\Rightarrow a = 9/5$ or $a = 3$

Put value of a in (i)

When a = 9/5, we get x = 9 or x = 27/5

When a = 3, we get x = 9 or x = 15

Hence option b and c are correct.