SelfStudy.in

15. The integral $\int_2^4 \frac{logx^2}{logx^2+log(36-12x+x^2)}dx$ is equal to

(1) 2 (2) 4 (3) 1 (4) 6

Answer:

Let $I = \int_2^4 \frac{logx^2}{logx^2+log(36-12x+x^2)}dx$

$$or\ I = \int_2^4 \frac{2logx}{2logx + log(6-x)^2}dx$$

$$or\ I = \int_2^4 \frac{2logx}{2logx + 2\log(6-x)}dx$$

$$I = \int_2^4 \frac{logx}{logx + \log(6-x)}dx \ \rightarrow (1)$$

From the properties of definite integral we know that

$$\int_a^b f(x)\,dx = \int_a^b f(a+b-x)dx$$

Therefore

$$I = \int_2^4 \frac{log(6-x)}{log(6-x) + \log[6-(6-x)]}dx$$

$$I = \int_2^4 \frac{log(6-x)}{log(6-x) + \log x}dx \rightarrow (2)$$

Adding (1) and (2) we get

$$2I = \int_2^4 \frac{logx + log(6-x)}{log(6-x) + \log x}dx$$

$$or\ 2I = [x]_2^4$$

$$or\ I = 1$$

Correct option is (3) 1