

$$D = \int_1^e \ln(x) dx$$

$$= \int_1^e \cancel{4x} \ln(x) dx$$

$$= [x \times \ln(x)]_1^e - \int_1^e \frac{1}{x} \times x dx$$

$$= [x \times \ln(x)]_1^e - \int_1^e 1 dx$$

$$= [x \times \ln(x)]_1^e - [x]_1^e$$

$$= [x \times \ln(x) - x]_1^e$$

$$= (e \times \ln(e) - e) - (1 \times \ln(1) - 1)$$

$$= (e \times 1 - e) - (-1)$$

$$= 0 + 1 = 1$$