

$$(ii) \int_1^e \ln x \, dx$$

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$$u = \ln x \quad v = x$$

$$\frac{du}{dx} = \frac{1}{x} \quad dv = dx$$

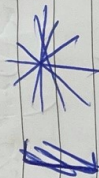
$$u = \ln x \quad v = x$$

$$\frac{du}{dx} = \frac{1}{x} \quad dv = dx$$

$$= x \ln x - \int \frac{x}{x} \, dx$$

$$= x \ln x - \int 1 \, dx$$

$$= x \ln x - x + C$$



$$3. a) i) \left(\frac{1+i}{1-i} \right)^3$$

$$\frac{1+i}{1-i} \times \frac{1+i}{1+i}$$

$$\left(\frac{1+2i+i^2}{1-i^2} \right)^3 = \left(\frac{1+2i-1}{1+1} \right)^3 = \left(\frac{2i}{2} \right)^3 = i^3$$

$$\int_0^1 [x \ln x - x] e^x \, dx = [e \ln e - e] - [0 \ln 0 - 0]$$

