$$\int_1^2 \frac{\log x}{x^3}\,dx$$

$$= \int_1^2 \left(-\frac{1}{2}x^{-2}\right)' \cdot \log x\,dx$$

$$= \left[-\frac{1}{2x^2} \times \log x\right]_1^2 + \int_1^2 \frac{1}{2x^2} \times \frac{1}{x}\,dx$$

$$= -\frac{1}{8}\log 2 + \left[\frac{1}{2} \times \left(-\frac{1}{2}x^{-2}\right)\right]_1^2$$

$$= -\frac{1}{8}\log 2 - \left[\frac{1}{4x^2}\right]_1^2$$

$$= -\frac{1}{8}\log 2 - \left(\frac{1}{16} - \frac{1}{4}\right)$$

$$= -\frac{1}{8}\log 2 - \left(\frac{1}{16} - \frac{4}{16}\right)$$

$$= \boxed{\frac{3}{16} - \frac{1}{8}\log 2}$$