

TOPIC

Mathematics – Section I – Question 9

QUESTIONThe exact value of $\int_{0.2}^{2.2} xe^x dx$ is most nearly

- (A) 7.8036
- (B) 11.807
- (C) 14.034
- (D) 19.611

HINT

To solve this integral, we may integrate by parts.

$$\int u dv = uv - \int v du$$

SOLUTION

To solve this integral we must integrate by parts.

$$\int u dv = uv - \int v du$$

where

$$u = x, du = dx$$

and

$$dv = e^x dx, v = e^x$$

$$\begin{aligned}\int_{0.2}^{2.2} xe^x dx &= \int_{0.2}^{2.2} xd(e^x) \\ &= [xe^x]_{0.2}^{2.2} - \int_{0.2}^{2.2} e^x dx \\ &= [xe^x]_{0.2}^{2.2} - [e^x]_{0.2}^{2.2} \\ &= [xe^x - e^x]_{0.2}^{2.2} \\ &= (2.2e^{2.2} - e^{2.2}) - (0.2e^{0.2} - e^{0.2}) \\ &= 10.83 - (-0.9771) \\ &= 11.807\end{aligned}$$