

Integral Daily Challenge (@thecuriousmind22)

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1 Question

If

$$\int_e^x t f(t) dt = \sin x - x \cos x - \frac{x^2}{2},$$

Find $f(\pi/6)$.

2 Solution

By applying Leibniz Integral Rule,

$$x f(x) = \cancel{\cos x} - \cancel{\cos x} + x \sin x - x$$

$$f(x) = \sin x - 1$$

$$f\left(\frac{\pi}{6}\right) = \frac{1}{2} - 1$$

$$\boxed{f\left(\frac{\pi}{6}\right) = -\frac{1}{2}}$$