Q1

Sunday, November 22, 2020 8:07 PM

Evaluate the following integrals. You must show all your algebra.

1) $\int_0^{\pi} \sin(x)\,dx$

2) $\int_1^5 \frac{2}{x}\,dx$

3) $\int \sin^6(x)\cos(x)\,dx$

1) $\int_0^{\pi} \sin(x)\,dx = -\cos(x) + C \Big|_0^{\pi}$

$= F(\pi) - F(0)$

$= -\cos(\pi) - (-\cos(0))$

$= 1 + 1$

$= \boxed{2}$

2) $\int_1^5 \frac{2}{x}\,dx = \int_1^5 2\frac{1}{x}\,dx$

$= 2\ln(x) + C \Big|_1^5$

$= F(5) - F(1)$

$= 2\ln(5) - 2\ln(1)$ ($\ln(1) = 0$)

$= \boxed{2\ln(5)}$

3) $\int \sin^6(x)\cos(x)\,dx$, $u = \sin(x)$

$\frac{du}{dx} = \cos(x)$

$du = \cos(x)\,dx$

$= \int (\sin(x))^6 \cos(x)\,dx = \int u^6\,du$

$= \frac{u^{6+1}}{6+1} + C = \frac{u^7}{7} + C = \boxed{\frac{\sin^7(x)}{7} + C}$