

Tajah Warren

M122

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Quiz 9 pg 400 # 21, 30, 32, 37, 46

21. Evaluate the integral.

$$\begin{aligned}\int_0^2 (4/5 t^3 - 3/4 t^2 + 2/5 t) dt &= \left[ \frac{4}{5} \cdot \frac{1}{4} t^4 - \frac{3}{4} \cdot \frac{1}{3} t^3 + \frac{2}{5} \cdot \frac{1}{2} t^2 \right]_0^2 \\ &= \left[ \frac{1}{5} (2)^4 - \frac{1}{4} (2)^3 + \frac{1}{5} (2)^2 \right] - 0 \\ &= \left( \frac{16}{5} - \frac{8}{4} + \frac{4}{5} \right) - 0 \\ &= \left( \frac{20}{5} - \frac{8}{4} \right) - 0 \\ &= (4 - 2) - 0 \\ &= \boxed{2} \quad \checkmark\end{aligned}$$

30. Evaluate the integral.

$$\int_{-1}^2 (3u - 2)(u + 1) du$$

$$\begin{aligned}\int_{-1}^2 (3u^2 + u - 2) du &= \left[ \frac{1}{3} \cdot 3u^3 + \frac{1}{2} u^2 - 2u \right]_{-1}^2 \\ &= \left[ (2)^3 + \frac{1}{2} (2)^2 - 2(2) \right] - \left[ (-1)^3 + \frac{1}{2} (-1)^2 - 2(-1) \right] \\ &= 8 + 2 - 4 - (-1 + \frac{1}{2} + 2) \\ &= 6 - \frac{1}{2} - 1 \\ &= 5 - \frac{1}{2} \\ &= \boxed{\frac{9}{2}} \quad \checkmark\end{aligned}$$

32. Evaluate the integral.

$$\begin{aligned}\int_{\pi/4}^{\pi/3} \csc^2 \theta d\theta &= \left[ -\cot \theta \right]_{\pi/4}^{\pi/3} \\ &= -\cot \frac{\pi}{3} + \cot \frac{\pi}{4} \\ &= \boxed{-\frac{1}{\sqrt{3}} + 1} \quad / = \frac{\sqrt{3} - 1}{\sqrt{3}} = \boxed{\frac{3 - \sqrt{3}}{3}}\end{aligned}$$

37. Evaluate the integral.

$$\begin{aligned}\int_0^1 (x^e + e^x) dx &= \left[ \frac{x^{e+1}}{e+1} + e^x \right]_0^1 \\ &= \left[ \frac{1^{e+1}}{e+1} + e^1 \right] - \left[ \frac{0^{e+1}}{e+1} + e^0 \right] \\ &= \left[ \frac{1}{e+1} + e \right] - 0 + 1 \\ &= \boxed{\frac{1}{e+1} + e - 1} = \boxed{\frac{e^2}{e^2+1}}\end{aligned}$$

46 Sketch the region enclosed by the given curves and calculate its area.

$$y = x^3, y = 0, x = 1$$

$$\begin{aligned} \text{Area} &= \int_0^1 x^3 dx = \left[ \frac{x^4}{4} \right]_0^1 \\ &= \frac{1^4}{4} - \frac{0^4}{4} \\ &= \boxed{\frac{1}{4}} \end{aligned}$$

