

Each problem is worth 5 points. For full credit indicate clearly how you reached your answer.

1. Integrate $\int \frac{x^4}{(2+x^5)^6} dx$

5/5

Use u substitution

Set $u = 2 + x^5$

$\frac{du}{dx} = 5x^4$

Solve for dx

$du = 5x^4 dx$

$dx = \frac{du}{5x^4}$

Good

Substitute u and du into original equation

$= \int \frac{x^4}{u^6} \left(\frac{du}{5x^4} \right)$

$= \frac{1}{5} \int u^{-6} du$

$= \frac{1}{5} \left(\frac{u^{-5}}{-5} \right) + C$

$= -\frac{1}{25u^5} + C$

$= \boxed{-\frac{1}{25(2+x^5)^5} + C}$

2. Integrate $\int x \cos x dx$

USE INTEGRATION BY PARTS

$u = x \quad v = \sin x$

$du = dx \quad dv = \cos x dx$

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

$= x \sin x - \int \sin x dx$

$= x \sin x - (-\cos x) + C$

$\int x \cos x dx = x \sin x + \cos x + C$

Good

CHECK

$x \sin x + \cos x + C$

$x \cos(x) + \sin x + -\sin x$

$x \cos(x) \quad \text{OK!}$

Excellent