

Instructions: show all work. Use exact answers unless explicitly asked to do otherwise.

1. Find the anti-derivatives.

a. $\int 4e^t + t dt$

$$\int 4e^t + t dt$$

$$4e^t + \frac{t^2}{2} + C$$

b. $\int 2^{-1} + \frac{5}{3\sqrt[3]{x^2}} dx$

$$2^{-1} = \frac{1}{2} \quad \frac{5}{3\sqrt[3]{x^2}} = \frac{5}{3} x^{-2/3}$$

$$\int \frac{1}{2} + \frac{5}{3} x^{-2/3} dx = \frac{1}{2}x + \frac{5}{3} \cdot 3 x^{1/3} + C =$$

$$\frac{1}{2}x + 5\sqrt[3]{x} + C$$

c. $\int \frac{5u-4}{3} du$

$$\int \frac{5}{3}u - \frac{4}{3} du = \frac{5}{3} \frac{u^2}{2} - \frac{4}{3}u + C$$

$$\frac{5}{6}u^2 - \frac{4}{3}u + C$$

d. $\int \frac{(x^2+1)^3}{x} dx = \int \frac{x^6 + 3x^4 + 3x^2 + 1}{x} dx =$

$$\int x^5 + 3x^3 + 3x + \frac{1}{x} dx = \frac{x^6}{6} + \frac{3}{4}x^4 + \frac{3}{2}x^2 + \ln x + C$$