

Topic: Indefinite integrals

Question: Evaluate the indefinite integral.

$$\int (2 + x)(x^2 - 4) \, dx$$

Answer choices:

A $\frac{1}{6}x^5 + \frac{2}{3}x^4 - 2x^3 - 8x^2 + C$

B $2x + C$

C $\frac{1}{4}x^4 + \frac{2}{3}x^3 - 2x^2 - 8x + C$

D $3x^2 + 4x - 4 + C$

Solution: C

In order to integrate, we must first rewrite the function by multiplying the two binomial terms together.

$$\int x^3 + 2x^2 - 4x - 8 \, dx$$

$$\frac{1}{4}x^4 + \frac{2}{3}x^3 - \frac{4}{2}x^2 - 8x + C$$

$$\frac{1}{4}x^4 + \frac{2}{3}x^3 - 2x^2 - 8x + C$$

Topic: Indefinite integrals

Question: Evaluate the indefinite integral.

$$\int \frac{2x^3 - x^2 + 4}{x^2} dx$$

Answer choices:

A $\frac{x^3 - x^2 - 4}{x} + C$

B $\frac{2x^3 - 8}{x^3} + C$

C $\frac{\frac{1}{4}x^4 - \frac{1}{3}x^3 + 4x}{\frac{1}{3}x^3} + C$

D $3x - 1 + C$

Solution: A

Before we can integrate, we must rewrite by dividing each term in the numerator by the denominator.

$$\int \frac{2x^3 - x^2 + 4}{x^2} dx$$

$$\int 2x - 1 + 4x^{-2} dx$$

$$\frac{2}{2}x^2 - x + \frac{4}{-1}x^{-1} + C$$

$$x^2 - x - \frac{4}{x} + C$$

$$\frac{x^3}{x} - \frac{x^2}{x} - \frac{4}{x} + C$$

$$\frac{x^3 - x^2 - 4}{x} + C$$