

(1) Factor Denominator

What you'll Learn About

(2) A over one factor

How integrate a fraction when the denominator can be factored and the numerator is not the derivative of the denominator

(3) B over the other

(4) Get the common denominator

(5) Write down numerators

(6) Find the zeros of denominator

$$A) \int \frac{x-12}{x^2-4x} dx$$

$$\int \frac{x-12}{x^2-4x} dx = \int \frac{3}{x} + \frac{-2}{x-4}$$

$$\frac{x-12}{x^2-4x} = \frac{x-12}{x(x-4)} = \frac{A(x-4)}{x(x-4)} + \frac{B(x)}{(x-4)(x)}$$

$$x-12 = A(x-4) + BX$$

$$x=4 \quad -8 = 4B \quad B = -2$$

$$x=0 \quad -12 = -4A \quad A = +3$$

$$+ 3\ln|x| - 2\ln|x-4| + C$$

$$\ln|x^3| - \ln|(x-4)^2| + C$$

$$\ln \left| \frac{x^3}{(x-4)^2} \right| + C$$

$$B) \int \frac{-3}{x+5} + \frac{2}{x-2} =$$

$$B) \int \frac{16-x}{x^2+3x-10} dx$$

$$-3\ln|x+5| + 2\ln|x-2| + C$$

$$\frac{16-x}{x^2+3x-10} = \frac{16-x}{(x+5)(x-2)} = \frac{A(x-2)}{(x+5)(x-2)} + \frac{B(x+5)}{(x-2)(x+5)}$$

$$\ln|(x+5)^{-3}| + \ln|(x-2)^2| +$$

$$16-x = A(x-2) + B(x+5)$$

$$x=2 \quad 14 = 7B \quad B = 2$$

$$x=-5 \quad 21 = -7A \quad A = -3$$

$$\ln \left| (x+5)^{-3}(x-2)^2 \right| + C$$

$$\ln \left| \frac{(x-2)^2}{(x+5)^3} \right| + C$$