

## Partial Fractions n tha'

Write these as partial fractions...

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

$$\frac{x^2 + 7x + 10}{x^2 + 5x + 6}$$

$$\frac{6x^2}{3x - 1}$$

$$\frac{6x^3 + 1}{x^2 + 2}$$

Integrate these...

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

$$\int \frac{6x^2}{4x^2 - 9} dx$$

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

$$\int \frac{5x^3}{x^2 - 1} dx$$

## Lots of topics with a common theme

<p>Evaluate</p> $\sum_{n=2}^{20} \left( \frac{n^2 + 3}{n^2 - 1} - 1 \right)$	<p>Given that <math>y = 4</math> when <math>x = 0</math>, solve the differential equation</p> $\frac{dy}{dx} = \frac{x^2}{x^2 - 1}$	<p>Show that the region bounded by the curve</p> $y = \frac{6x^2}{2x - 3}$ <p>the <math>x</math> axis, and the lines <math>x = 2</math> and <math>x = 4</math>, has area</p> $21 + \frac{27}{2} \ln 5$	<p>A particle is initially at the origin and the velocity <math>v</math> of the particle at time <math>t</math> seconds, is given by</p> $v = \frac{3t^2 + 1}{t^2 - 1}$ <p>Find the displacement of the particle after 6 seconds.</p>
<p>Find equations for the asymptotes of the graph of</p> $y = \frac{6x^2 + 1}{(2x + 3)(x + 2)}$	<p>Determine for which values of <math>x</math> the function</p> $y = \frac{3x^2 + 4}{x^2 + 4x}$ <p>is increasing and for which it is decreasing.</p>	<p>Find the first three non-zero terms in the binomial expansion of</p> $\frac{x^2 + 3}{x^2 - 1}$ <p>and state the values of <math>x</math> for which the expansion is valid.</p>	<p>Evaluate</p> $\sum_{n=1}^{\infty} \frac{1}{n(n+1)}$