Integration

\[ A = \int_{a}^{b} [f(x) - g(x)] \, dx \]

Finding where curve and line intersect, \( f(x) = g(x) \) gives the limits \( a \) and \( b \).

Integration of Polynomials

\[ I = \int \frac{1}{x^2} (2x - 1) \, dx \]

\[ I = \int \left( 2x^2 - x^\frac{3}{2} + x^\frac{1}{2} \right) \, dx \]

\[ I = \frac{4}{5} x^\frac{5}{2} - \frac{2}{3} x^\frac{3}{2} + C \]

IF \( f'(x) = ax^n \)

Then \( I = f(x) = \frac{a x^{n+1}}{n+1} \)

Remember to change sign to + if area is below the axis.

Remember to work out separately the area above and below the \( x \)-axis.

Integration is the process of finding the AREA under a curve and the \( x \)-axis.

\[ I = \int_{1}^{2} \frac{1}{2 \sqrt{x}} \, dx \]

\[ I = \int_{1}^{2} x^{\frac{1}{2}} \, dx \]

\[ I = \left[ \frac{1}{x^{\frac{1}{2}}} \right]^{2}_{1} \]

\[ = \sqrt{2} - 1 \]