

Integration

Essential information

- The **area under a straight line graph**, $y = mx + c$ between $x = a$ and $x = b$ is given by

$$\text{Area} = \left(\frac{1}{2}mb^2 + cb \right) - \left(\frac{1}{2}ma^2 + ca \right)$$

- Integration** is the reverse of *differentiation*.
- Standard integrals** are

$$\int x^n dx = \frac{x^{n+1}}{n+1} + K \quad \text{where } K \text{ is a constant and } n \text{ any integer except } n = -1$$

$$\int x^{-1} dx = \ln x + K \quad \text{where } K \text{ is a constant}$$

$$\int e^x dx = e^x + K$$

- Note that** $\int (au(x) + bv(x))dx = a \int u(x)dx + b \int v(x)dx$
where a and b are constants,
and u and v functions of x

- Area under the curve** $y = f(x)$ from $x = a$ to $x = b$ is given by the integral

$$A = \int_a^b f(x)dx$$

