

The function  $f(x) = (x - 3)^2 + \frac{1}{2}$  has domain  $D_f : (-\infty, \infty)$  and range  $R_f : \left[\frac{1}{2}, \infty\right)$ .

## 1 Limits

$$\lim_{x \rightarrow a}$$

$$\lim_{x \rightarrow a} f(x)$$

$$\lim_{x \rightarrow a^-} f(x)$$

$$\lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a} = f'(a)$$

## 2 Integrals

$$\int \sin x \, dx = -\cos x + C$$

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$$\int_a^b$$

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$$\int_a^b x^2 \, dx = \left[ \frac{x^3}{3} \right]_a^b = \frac{b^3}{3} - \frac{a^3}{3}$$

## 3 Summations

$$\Sigma$$

$$\Sigma$$

$$\sum_{n=1}^{\infty} ar^n = a + ar + ar^2 + \cdots + ar^n$$

## 4 Integrals, limits and summations—all together

$$\int_a^b f(x) \, dx = \lim_{n \rightarrow \infty} \sum_{k=1}^n f(x_k) \cdot \Delta x$$

## 5 Vectors

$$\vec{v} = v_1 \vec{i} + v_2 \vec{j} = \langle v_1, v_2 \rangle$$