Computing the slope of x^3 via a limit

$$\lim_{h \to 0} \frac{(x+h)^3 - x^3}{h} = 3x^2$$

A famous limit of an indeterminate form 0/0

$$\lim_{x \to 0} \frac{\sin(x)}{x} = 1$$

A limit as x approaches infinity

$$\lim_{x \to \infty} x^{\frac{1}{x}} = 1$$

A limit involving extra variables

$$\lim_{x \to 0} \frac{a^x - b^x}{x} = \ln(a) - \ln(b)$$

The limit of $1/x$ as x approaches 0 from the left

$$\lim_{x \to 0} \frac{1}{x} = -\infty$$

A limit for which L'Hopital's rule would be slow

$$\lim_{x \to 0} \frac{(\sin(x))^{249} (\ln(1-x))^{251}}{x^{100} (\arctan(x))^{400}} = -1$$

The formula for the slope of x^3

$$\frac{d}{dx} x^3 = 3x^2$$

An illustration of the chain rule

$$\frac{d}{dx} \sin\left(x^3\right) = 3x^2 \cos\left(x^3\right)$$

A partial derivative

$$\frac{d}{dy} x^2 y^3 = 3x^2 y^2$$

A 5th-order Taylor polynomial expanded about x=0

$$\text{TAYLOR}(\mathbf{e}^x, x, 0, 5) = 0.00833333x^5 + 0.0416666x^4 + 0.166666x^3 + 0.5x^2 + x + 1$$

A 7th-order Taylor polynomial

$$\text{TAYLOR}(\ln(\cos(ax)), x, 0, 7) = -0.0222222a^6x^6 - 0.0833333a^4x^4 - 0.5a^2x^2$$

An antiderivative of x^2 with respect to x

$$\int x^2 dx = 0.333333x^3$$

An antiderivative of cosine(x) with respect to x

$$\int \cos(x) dx = \sin(x)$$

An antiderivative obtained by substitution

$$\int x^2 \cos\left(ax^3 + b\right) dx = \frac{0.333333 \sin(b) \cos\left(ax^3\right)}{a} + \frac{0.333333 \cos(b) \sin\left(ax^3\right)}{a}$$

A definite integral for x going from a to b

$$\int_a^b x^2 \, dx = 0.333333b^3 - 0.333333a^3$$

An integral having an infinite integration limit

$$\int_{a^2}^{\infty} \frac{1}{x^2} \, dx = \frac{1}{a^2}$$

An integral having an endpoint singularity

$$\int_0^{b^2} \frac{1}{\sqrt{x}} \, dx = 2\,|b|$$

A 2-dimensional integral over a quarter disk

$$\int_0^r \int_0^{\sqrt{r^2 - x^2}} xy \, dy \, dx = 0.125r^4$$

The formula for the sum of an arithmetic series

$$\sum_{k=0}^{n} k = 0.5n\,(n+1)$$

The formula for the sum of successive cubes

$$\sum_{k=0}^{n} k^3 = 0.25n^2\,(n+1)^2$$

The formula for the sum of a geometric series

$$\sum_{k=0}^{n} a^k = \frac{a^{n+1}}{a-1} - \frac{1}{a-1}$$

The sum of an infinite series

$$\sum_{k=0}^{\infty} 2^{-k} = 2$$

A sum for which iteration would be slow

$$\sum_{k=-123456788}^{123456789} \frac{k}{370370367} = 0.333333$$

The product of successive even integers

$$\prod_{k=1}^{n} 2k = 2^n n$$