Exponential and Logarithmic Functions (1A)

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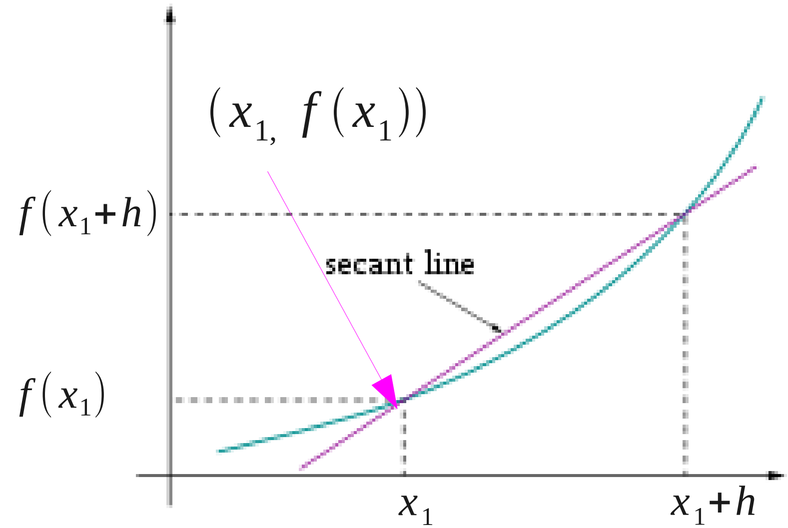
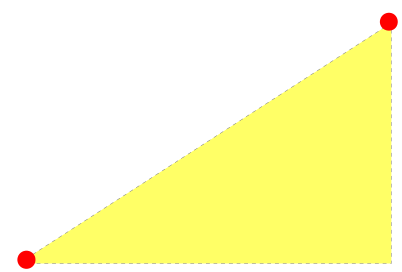
A triangle and its slope

$$y = f(x)$$

$$\frac{f(x_1 + h) - f(x_1)}{h}$$



$(x_1 + h, f(x_1 + h))$



$(x_1, f(x_1))$

http://en.wikipedia.org/wiki/Derivative

$\boxed{\log_b x}$ $\qquad b^{\boxed{}} = x$

$\boxed{\log_b b}$ $\qquad b^{\boxed{1}} = b$

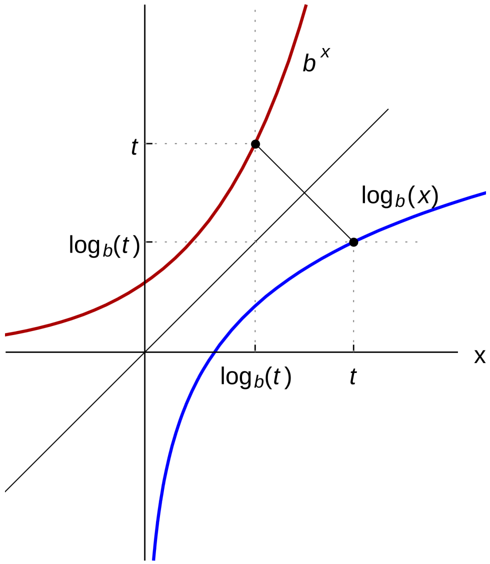
$\boxed{\log_b 1}$ $\qquad b^{\boxed{0}} = 1$

$\boxed{\log_b b^x}$ $\qquad b^{\boxed{x}} = b^x$

$\boxed{\log_b x}$ $\qquad b^{\boxed{y}} = x$

$\boxed{\log_b x^r}$ $\qquad b^{\boxed{r\,y}} = x^r$ $\qquad \boxed{r \log_b x}$

Inverse Relations



$$x \longrightarrow \boxed{f(x)} \longrightarrow e^x$$

$$x \longrightarrow \boxed{g(x)} \longrightarrow \log_e x$$

$$x \longrightarrow \boxed{f(x)} \longrightarrow e^x \longrightarrow \boxed{g(x)} \longrightarrow \log_e e^x = x$$

$$x \longrightarrow \boxed{g(x)} \longrightarrow \log_e x \longrightarrow \boxed{f(x)} \longrightarrow e^{\log_e x} = x$$

References

[1] http://en.wikipedia.org/
[2] M.L. Boas, “Mathematical Methods in the Physical Sciences”
[3] E. Kreyszig, “Advanced Engineering Mathematics”
[4] D. G. Zill, W. S. Wright, “Advanced Engineering Mathematics”