Math Formulas: Useful Limits

The General Limit Formulas

If $\lim_{x\to a} f(x) = l$ and $\lim_{x\to a} g(x) = m$,then

1. $$\lim_{x\to a} \; [f(x) \pm g(x)] = l \pm m$$
2. $$\lim_{x\to a} \; [f(x) \cdot g(x)] = l \cdot m$$
3. $$\lim_{x\to a} \frac{f(x)}{g(x)} = \frac{l}{m}$$
4. $$\lim_{x\to a} c \cdot f(x) = c \cdot l$$
5. $$\lim_{x\to a} \frac{1}{f(x)} = \frac{1}{l}$$

The Common Limits

6. $$\lim_{x\to\infty} \; \left(1 + \frac{1}{n}\right)^n = e$$
7. $$\lim_{x\to\infty} \; (1+n)^{1/n} = e$$
8. $$\lim_{x\to 0} \; \frac{\sin x}{x} = 1$$
9. $$\lim_{x\to 0} \; \frac{\tan x}{x} = 1$$
10. $$\lim_{x\to 0} \; \frac{\cos x - 1}{x} = 0$$
11. $$\lim_{x\to a} \; \frac{x^n - a^n}{x - a} = n\, a^{n-1}$$