# L'Hôpital's Rule

1. Suppose that $\lim_{x\to a} f(x) = 0$ and $\lim_{x\to a} p(x) = \infty$.

   Then $\lim_{x\to a} f(x)p(x)$

   (a) is indeterminate

   (b) $= 0$

   (c) $= \infty$

   (d) $= 1$

2. Suppose that $\lim_{x\to a} h(x) = 1$ and $\lim_{x\to a} p(x) = \infty$.

   Then $\lim_{x\to a} h(x)p(x)$

   (a) is indeterminate

   (b) $= 0$

   (c) $= \infty$

   (d) $= 1$

3. Suppose that $\lim_{x\to a} p(x) = \infty$ and $\lim_{x\to a} q(x) = \infty$.

   Then $\lim_{x\to a} p(x)q(x)$

   (a) is indeterminate

   (b) $= 0$

   (c) $= \infty$

   (d) $= 1$

4. Suppose that $\lim_{x\to a} f(x) = 0$ and $\lim_{x\to a} g(x) = 0$.

   Then $\lim_{x\to a} f(x)^{g(x)}$

   (a) is indeterminate

   (b) $= 0$

   (c) $= \infty$

   (d) $= 1$

5. Suppose that $\lim_{x\to a} f(x) = 0$ and $\lim_{x\to a} p(x) = \infty$.

   Then $\lim_{x\to a} f(x)^{p(x)}$

   (a) is indeterminate

   (b) $= 0$

   (c) $= \infty$

   (d) $= 1$

6. Suppose that $\lim_{x\to a} h(x) = 1$ and $\lim_{x\to a} p(x) = \infty$.

   Then $\lim_{x\to a} h(x)^{p(x)}$

   (a) is indeterminate

(b) $= 0$

(c) $= \infty$

(d) $= 1$

7. Suppose that $\lim_{x \to a} f(x) = 0$ and $\lim_{x \to a} p(x) = \infty$.

   Then $\lim_{x \to a} p(x)^{f(x)}$

   (a) is indeterminate

   (b) $= 0$

   (c) $= \infty$

   (d) $= 1$

8. Suppose that $\lim_{x \to a} p(x) = \infty$ and $\lim_{x \to a} q(x) = \infty$.

   Then $\lim_{x \to a} p(x)^{q(x)}$

   (a) is indeterminate

   (b) $= 0$

   (c) $= \infty$

   (d) $= 1$

9. Consider the functions $f(x) = e^x$ and $g(x) = x^{1,000,000}$. As $x \to \infty$ which of the following is true?

   (a) $f$ grows faster than $g$.

   (b) $g$ grows faster than $f$.

   (c) We cannot determine.

   (d) They grow at the same rate like all exponentials.

10. The limit $\lim_{x \to \infty} [xe^{1/x} - x]$

    (a) Does not exist because $\infty - \infty$ is not defined.

    (b) Converges to 1.

    (c) Is $\infty$ because $xe^{1/x}$ grows faster than $x$.

    (d) Converges to 0.