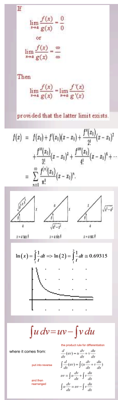

Other Indeterminate Forms

Indeterminate forms

$$\frac{0}{0},\quad \frac{\infty}{\infty},\quad 0\cdot\infty,\quad \infty-\infty,\quad 0^{\infty},\quad \infty^{0},\quad 1^{\infty}$$

Other Indeterminate Forms $\frac{\infty}{\infty}$

$$\lim_{x\to\infty}\frac{x}{e^x}$$

$$\lim_{x\to\infty}\frac{x^2+4x-5}{3x^2-2x}$$

L'Hopital's rule for $\frac{\infty}{\infty}$

If $\lim_{x\to a}|f(x)|=\lim_{x\to a}|g(x)|=\infty$ then

$$\lim_{x\to a}\frac{f(x)}{g(x)}=\lim_{x\to a}\frac{f'(x)}{g'(x)}$$ assuming $\lim_{x\to a}\frac{f'(x)}{g'(x)}$ exists (finite or ∞).

Now use l'Hopital's Rule for this:

$$\lim_{x\to\infty}\frac{x}{e^x}$$

EX 1 $\lim_{x\to\infty}\frac{x^9}{e^x}$

EX 2 $\lim_{x\to\infty}\frac{(\ln x)^2}{2^x}$

Indeterminate Forms $0\cdot\infty$ and $\infty - \infty$

EX 3 $\lim_{x\to 0} 3x^2 \csc^2 x$

EX 4 $\lim_{x\to \pi/2}(\tan x - \sec x)$

Indeterminate Forms 0^0, ∞^0, 1^∞

EX 5 $\lim_{x\to 0}(\cos x)^{1/x^2}$

EX 6 $\lim_{x\to 0^+} x^x$

Indeterminate Forms	NOT Indeterminate Forms
$\frac{0}{0}$	1^0
$\frac{\pm\infty}{\pm\infty}$	0^∞
$0\cdot\infty$	∞^∞
$\infty-\infty$	$\infty+\infty$
0^0	$\infty\cdot\infty$
∞^0	$\frac{0}{\infty}$
1^∞	$\frac{\infty}{0}$