Math 131 - April 1, 2016

Warm-up Problems

1. Identify which of these are indeterminate and why:

$\frac{0}{0}$	$\frac{1}{0}$
$\frac{\infty}{\infty}$	$\frac{0}{1}$
$0 \cdot \infty$	$\frac{0}{\infty}$
$\infty - \infty$	$\infty + \infty$
0^0	2^∞
1^∞	$3 \cdot \infty$
∞^0	∞^2

2. Identify the "form" of the limits.

   (a) $\lim_{x\to\infty} \sqrt{x^2+1} - \sqrt{x+1} =$

   (b) $\lim_{x\to\infty} x - \ln x =$

   (c) $\lim_{x\to\infty} x^{1/x} =$

   (d) $\lim_{x\to 0} \frac{1}{x} - \frac{1}{e^x - 1} =$

   (e) $\lim_{x\to 0^+} (e^x - 1)(\ln x) =$

   (f) $\lim_{x\to 0^+} x^x =$

   (g) $\lim_{x\to\infty} \left(1 + \frac{1}{x}\right)^{2x} =$

   (h) $\lim_{x\to\infty} x^x =$

   (i) $\lim_{x\to 0^+} x^{x^x} =$

3. Find the error

$$\lim_{x\to 2} \frac{x^3 - x^2 - x - 2}{x^3 - 3x^2 + 3x - 2} \overset{LH}{=} \lim_{x\to 2} \frac{3x^2 - 2x - 1}{3x^2 - 6x + 3}$$
$$\overset{LH}{=} \lim_{x\to 2} \frac{6x - 2}{6x - 6} = \frac{6}{6} = 1$$

Lecture Problems

4. Compute the limits in Problem 2.

5. Determine if there is a slant asymptote and find it:

$$y = \frac{4x^3 + 3x^2 - 2x + 1}{x^2}$$