MATH 1101Y 2009 Quiz 2 (a)

1. (2 pts) Determine the infinite limit

$$\lim_{x\to 1^-} \frac{x-1}{x^2-2x+1}.$$

Solution:

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

□

2. (2 pts) Evaluate the limit, if it exists.

$$\lim_{h\to 0} \frac{\sqrt{4+h}-2}{h}.$$

Solution:

$$\begin{aligned}
\lim_{h\to 0} \frac{\sqrt{4+h}-2}{h} &= \lim_{h\to 0} \frac{\left(\sqrt{4+h}-2\right)\left(\sqrt{4+h}+2\right)}{h\left(\sqrt{4+h}+2\right)} \\
&= \lim_{h\to 0} \frac{4+h-4}{h\left(\sqrt{4+h}+2\right)} = \lim_{h\to 0} \frac{h}{h\left(\sqrt{4+h}+2\right)} \\
&= \lim_{h\to 0} \frac{1}{\left(\sqrt{4+h}+2\right)} = \frac{1}{4}.
\end{aligned}$$

□

3. (1 pt) Evaluate the limit, if it exists.

$$\lim_{x\to 1} \frac{x^2+x-2}{x-1}.$$

Solution:

$$\begin{aligned}
\lim_{x\to 1} \frac{x^2+x-2}{x-1} &= \lim_{x\to 1} \frac{x^2+x-2}{x-1} \\
&= \lim_{x\to 1} \frac{(x+2)(x-1)}{x-1} \\
&= \lim_{x\to 1} (x+2) = 3.
\end{aligned}$$

□