

232 Quiz 1
September 2, 2011

Name: *key* v1

Section: _____

Name: _____

Work with your partner on each problem; do not split up problems or tasks. You must discuss each problem together and agree on a final solution. Hand in one quiz per group.

You may use your hand-written Notebooks but no other materials and no technology at all. Please keep your discussions quiet so as not to disturb or inform other groups.

1. Find the domain of $f(x) = \frac{1}{\ln(x-2)}$. Show your work clearly and write your answer in interval notation.

$$\text{need } x-2 > 0 \quad \Rightarrow \quad x > 2$$

$$\ln(x-2) \neq 0 \quad \Rightarrow \quad x-2 \neq 1 \quad \Rightarrow \quad x \neq 3$$

$$\text{domain is } \boxed{(2, 3) \cup (3, \infty)}.$$

2. Calculate $\lim_{x \rightarrow -\infty} \frac{2^x - 4^x}{3^x}$. You must show your work clearly and in order for full credit.

$$\text{one way: } \lim_{x \rightarrow -\infty} \left(\underbrace{\left(\frac{2}{3}\right)^x}_{\infty} - \underbrace{\left(\frac{4}{3}\right)^x}_{\infty} \right) = \infty - 0 = \boxed{\infty}.$$

or...

$$\text{another way: } \lim_{x \rightarrow -\infty} \frac{2^x(1-2^x)}{3^x} = \lim_{x \rightarrow -\infty} \underbrace{\left(\frac{2}{3}\right)^x}_{\infty} (1-2^x) = \infty(1-0) = \infty.$$

or...

$$\text{another way: } \lim_{x \rightarrow -\infty} \frac{2^x - 4^x}{3^x} \left(\frac{1}{2^x} \right) = \lim_{x \rightarrow -\infty} \frac{1-2^x}{\left(\frac{3}{2}\right)^x} \rightarrow \frac{1-0}{0^+} \rightarrow \infty.$$