

232 Quiz 1

September 2, 2011.

Name: *key* v2

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 $f(x) = \frac{1}{\ln(x-3)}$. Show your work clearly and write your answer in interval notation.

$$\text{need } x-3 > 0 \Rightarrow x > 3$$

$$\ln(x-3) \neq 0 \Rightarrow x-3 \neq 1 \Rightarrow x \neq 4$$

$$\text{domain is } \boxed{(3, 4) \cup (4, \infty)}.$$

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

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

or...

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

or...

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