Name: _____ _____ **/ 22**

There are 22 points possible on this quiz. No aids (book, calculator, etc.) are permitted. Show all work for full credit.

1. [4 points]

a. Why is the following not a true statement? $\dfrac{(x-3)(x-2)}{x-2} = x-3$

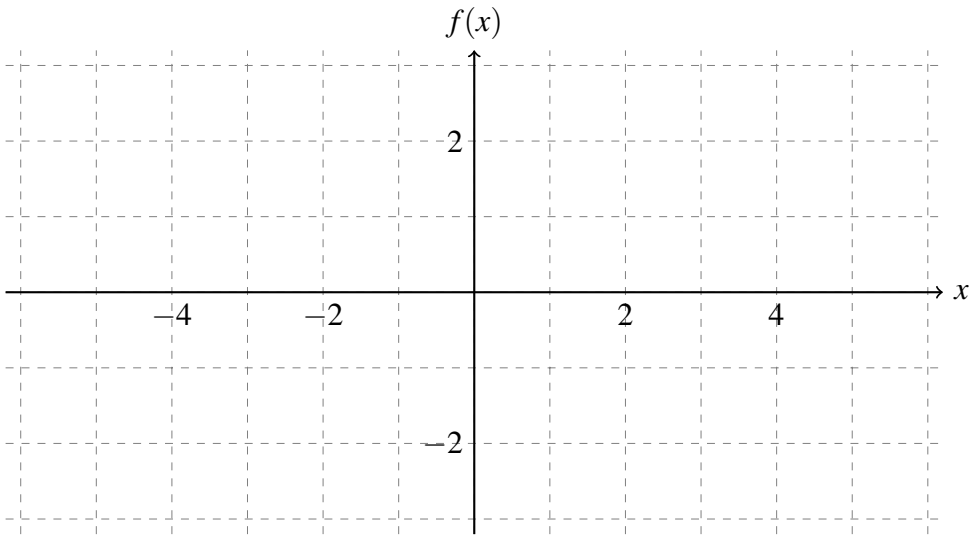
b. Nevertheless, explain why the following equation is correct. $\lim\limits_{x\to 0} \dfrac{(x-3)(x-2)}{x-2} = \lim\limits_{x\to 0} x-3$

2. [4 points] Compute $\lim\limits_{x\to 2} \dfrac{x^2-4}{x-2}$

3. [4 points] Compute $\lim\limits_{h\to 0} \dfrac{\frac{1}{5+h} - \frac{1}{5}}{h}$.

4. [6 points] Consider the function $f(x) = \begin{cases} \frac{2}{x-1} & x \leq 0 \\ 2\cos(x) & x > 0. \end{cases}$

a. In the diagram below, graph $f(x)$.



b. Explain why $f(x)$ isn't continuous at $x = 0$.

5. [4 points] Use the Intermediate Value Theorem to justify the claim that there exists a number x satisfying $\sin(x) - 2x + 1 = 0$.