STUDENT NAME:

Calculus 1550, section 6. Friday, February 6, 2004. Fifth quiz.

Find the following limits by factoring and cancellation (where necessary), and other limit laws, but you do not need to explicitly show every law used. If they do not exist, give a reason. [2 points each.]

1. $\lim_{x\to 2} \frac{x^2-3x+2}{x^2-4} = \lim_{x\to 2} \frac{\cancel{(x-2)}(x-1)}{\cancel{(x-2)}(x+2)} = \lim_{x\to 2} \frac{x-1}{x+2} = \frac{2-1}{2+2} = \boxed{\frac{1}{4}}$

2. $\lim_{x\to -2} \frac{x^2-3x+2}{x^2-4} = \lim_{x\to -2} \frac{\cancel{(x-2)}(x-1)}{\cancel{(x-2)}(x+2)} = \lim_{x\to -2} \frac{(x-1)}{x+2} = \boxed{\text{not defined,}}$

   because $-2-1=-3$, but $-2+2=0$.

3. $\lim_{x\to 2} \frac{x^2-3x+2}{x^2-1} = \lim_{x\to 2} \frac{x^2-3x+2}{x^2-1} = \frac{4-6+2}{4-1} = \frac{0}{3} = \boxed{0}$

   ↑ can use rule $\lim_{x\to a} f(x) = f(a)$ if $f(x)$ is rational and $a\in \text{domain}(f)$, as in this case

4. $\lim_{x\to 1} \frac{x^2-3x+2}{x^2-1} = \lim_{x\to 1} \frac{(x-2)\cancel{(x-1)}}{(x+1)\cancel{(x-1)}} = \lim_{x\to 1} \frac{(x-2)}{(x+1)} = \frac{1-2}{1+1} = \boxed{\frac{-1}{2}}$

5. $\lim_{x\to 2} \frac{x^2-4x+4}{x^2-4} = \lim_{x\to 2} \frac{\cancel{(x-2)}(x\ 2)}{\cancel{(x-2)}(x+2)} = \lim_{x\to 2} \frac{(x\ 2)}{(x+2)}$

   $= 0/4 = \boxed{0}$

   because $2+2=4$ but $2-2=0$.