1. Not all limit questions have valid answers. Limits may not exist because the quantity may approach infinity, or the quantity may oscillate but not approach a value, or the quantity may approach an undefined situation.
2. $\lim\limits_{x \to 3} \dfrac{x+1}{x-3}$ does not exist because the quantity approaches infinity.
3. $\lim\limits_{x \to 0} \dfrac{|x|}{x}$ does not exist.
4. $\lim\limits_{x \to 0^-} \dfrac{|x|}{x}$ is read, "The limit as x approaches 0 from the left of …" This limit is -1.
5. $\lim\limits_{x \to 0^+} \dfrac{|x|}{x}$ is read, "The limit as x approaches 0 from the right of …" This limit is 1.
6. $\lim\limits_{x \to 0} \sqrt{x}$ does not exist because it is not possible to approach 0 from both sides.
7. $\lim\limits_{x \to 0^+} \sqrt{x} = 0$
8. $\lim\limits_{x \to 5} \dfrac{\sqrt{x-4}-1}{x-5}$ can be found by rationalizing the numerator. That's right not the denominator, but the numerator. Multiply top and bottom by the conjugate of the top.
$$\lim_{x \to 5} \frac{\sqrt{x-4}-1}{x-5} = \lim_{x \to 5} \frac{\sqrt{x-4}-1}{x-5} \bullet \frac{\sqrt{x-4}+1}{\sqrt{x-4}+1} = \lim_{x \to 5} \frac{x-5}{(x-5)(\sqrt{x-4}+1)} = \lim_{x \to 5} \frac{1}{\sqrt{x-4}+1} = \frac{1}{2}$$
9. We've discovered a new technique. Rationalizing the Numerator!!! It's likely that you've never run into a situation where this was necessary.

Pre-Calculus 2 Assignment 249 Thursday, May 21, 2015 Hour Name ______________________________

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

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

3. $\lim_{x \to 3} \frac{\sqrt{x+1} - 2}{x - 3} =$

4. $\lim_{x \to 0} \frac{\sqrt{5+x} - \sqrt{5}}{x} =$

5. $\lim_{x \to 0} \frac{\sqrt{7-x} - \sqrt{7}}{x} =$

6. $\lim_{x \to 2} \frac{4 - \sqrt{18 - x}}{x - 2} =$

7. $\lim_{x \to 6} \frac{x - 6}{x^2 - 36} =$

8. $\lim_{x \to 9} \frac{9 - x}{x^2 - 81} =$

9. $\lim_{x \to -1} \frac{1 - 2x - 3x^2}{1 + x} =$

10. $\lim_{x \to -4} \frac{2x^2 + 7x - 4}{x + 4} =$