

Math 15 Assignment – 01, 02, & 03; Functions, Limits, Infinite Limits and Continuity

1	<p>For $f(x) = \frac{1}{x^2}$</p> <p>A) For the difference quotient $\frac{f(2+h)-f(2)}{h}$ and simplify.</p> <p>B) Use the difference quotient to find the slope of the secant line from $x = 2$ to $x = 5$. (Hint: $h = 3$)</p>
2	<p>For $f(x) = \frac{x-2}{x^2-7x+10}$,</p> <p>A) find the domain.</p> <p>B) find the $\lim_{x \rightarrow 2} f(x)$ (if the limit exists)</p> <p>C) find the infinite limit: $\lim_{x \rightarrow 5^-} f(x)$</p> <p>D) find the discontinuities of $f(x)$. Explain why they are discontinuities. (That is, (a) is $f(c)$ defined; (b) does $\lim_{x \rightarrow c} f(x)$ exist; (c) is $\lim_{x \rightarrow c} f(x) = f(c)$)</p> <p>E) Which discontinuities are removable? (Explain why.)</p>

	<p>(#2 continued) F) find the vertical asymptotes.</p>
3	<p>For $f(x) = \frac{ x-2 }{x-2}$,</p> <p>A) draw the graph</p> <p>B) find $\lim_{x \rightarrow 2} f(x)$ if the limit exists (if it does not exist then demonstrate why).</p> <p>C) show that $f(x)$ is discontinuous at $x = 2$.</p> <p>D) Is the discontinuity removable or non-removable (explain why)?</p>
4	<p>For $f(x) = \begin{cases} 3x^2 - 2, & x \neq 1 \\ 5, & x = 1 \end{cases}$, find</p> <p>A) $f(1) =$</p> <p>B) find $\lim_{x \rightarrow 1} f(x)$ (if it exists)</p> <p>C) Explain why $f(x)$ is discontinuous at $x = 1$.</p> <p>D) Is the discontinuity at $x = 1$ removable or non-removable (explain why)?</p>