MTH 1125 Test #1

Summer 2014

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Instructions. Show CLEARLY how you arrive at your answers.

1. Compute: $\lim_{x\to 1} \frac{x^2+2x+4}{x^3-2x+4} =$

2. Compute: $\lim_{x\to 3} \frac{x^2-4x+3}{x^2-x-6} =$

3. Compute: $\lim_{x\to -\infty} \frac{10x^3+4x^2+2}{5x^4-8x^3+2x^2+x} =$

4. Compute: $\lim_{x\to -2} \frac{x-1}{x^2-x-6} =$

5. $f(x) = 8x^4 + 10x^3 + 16x^2 + 30x + 8\sqrt{x} + 4;$ Compute: $f'(x)$.

6. $\frac{d}{dx}\left[-3\sin(x) + 6\cos(x)\right] =$

7. Find the asymptotes and graph: $f(x) = \frac{x-1}{x^2+x-6}$

8.

$x =$	$f(x) =$
3.5	-15.1
3.9	-227.8
3.99	-1212.3
3.999	-21156.3
3.9999	-834561.9

$x =$	$f(x) =$
4.5	-15.1
4.1	-227.8
4.01	-1212.3
4.001	-21156.3
4.0001	-834561.9

Based on the information in the table above, do the following:

(a) $\lim_{x \to 4^-} f(x) =$

(b) $\lim_{x \to 4^+} f(x) =$

(c) Graph $f(x)$

9. Compute: $\lim_{x\to 5} \frac{\sqrt{20+x}-5}{x-5} =$

10. $f(x) = 3x^2 + 5x + 1$; compute $f'(x)$ **using the definition of derivative.** (i.e., compute $f'(x)$ using the "limiting process.")

11. Compute: $\frac{d}{dx}\left[x^2 \tan(x)\right] =$

12. Compute: $\frac{d}{dx}\left[\frac{\sec(x)}{x^2+1}\right] =$

EXTRA - WOW! (7 pts) Determine whether or not $f(x)$ is continuous at the point $x = 3$. (Justify your answer.)

13. $f(x) = \begin{cases} \frac{x^2-9}{x-3} & \text{for } x < 3 \\ 2 & \text{for } x = 3 \\ 12 - 2x & \text{for } x > 3 \end{cases}$