

Assignment #4

Name Answer Key

Due 2 October 2009

1. The point $P(2, 1/5)$ lies on the curve $y = f(x) = 1/(1+x^2)$. In each of the following, a point $Q(x, f(x))$ is specified by a given value for x ; find the slope of the secant line PQ .

(a) $x = 3$

$$\frac{f(3) - f(2)}{3 - 2} = -\frac{1}{10} = -.10$$

2.5
pts.

(b) $x = 2.5$

$$\frac{f(2.5) - f(2)}{2.5 - 2} = -.124138$$

(c) $x = 2.1$

$$\frac{f(2.1) - f(2)}{2.1 - 2} = -.151571$$

(d) $x = 2.01$

$$\frac{f(2.01) - f(2)}{2.01 - 2} = -.159124$$

(e) $x = 2.001$

$$\frac{f(2.001) - f(2)}{2.001 - 2} = -.159912$$

2. Let $f(x) = \frac{x^2 - 5x + 3}{x^3 - x^2}$. In each case, evaluate the infinite limit or explain why the infinite limit does not exist.

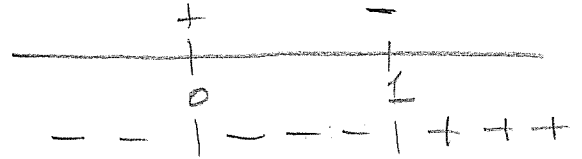
$$x^2(x-1)$$

(a) $\lim_{x \rightarrow 1} f(x)$

2 pts

$\lim_{x \rightarrow 1^-} f(x) = +\infty$
 $\lim_{x \rightarrow 1^+} f(x) = +\infty$

Thus the limit d.n.e.



(b) $\lim_{x \rightarrow 0} f(x)$

2 pts.

$\lim_{x \rightarrow 0^+} f(x) = -\infty$
 $\lim_{x \rightarrow 0^-} f(x) = -\infty$

Thus $\lim_{x \rightarrow 0} f(x) = -\infty$.

3. Sketch the graph of a curve satisfying the following conditions:

- $f(0) = 2$
- $f(2) = 1$
- $f(-1) = 2$
- $\lim_{x \rightarrow 0^-} f(x) = 1$
- $\lim_{x \rightarrow 0^+} f(x) = 3$
- $\lim_{x \rightarrow 1} f(x) = +\infty$
- $\lim_{x \rightarrow -1^+} f(x) = 0$

3.5 pts

There is not a unique answer.

