

Math 1041, Quiz 1

Thursday, 9/8/11

Name: Solutions

1. Consider the function $f(x) = \frac{1}{x-1}$. Compute the slope m_{PQ} of the secant line through points P and Q , where

$$P = (2, f(2)), \quad Q = (2.5, f(2.5)).$$

$$\begin{aligned} m_{PQ} &= \frac{f(2.5) - f(2)}{2.5 - 2} = \frac{\frac{1}{1.5} - \frac{1}{1}}{0.5} = \frac{\frac{2}{3} - 1}{\frac{1}{2}} \\ &= \frac{-\frac{1}{3}}{\frac{1}{2}} = -\frac{1}{3} \cdot \frac{2}{1} = -\frac{2}{3}. \end{aligned}$$

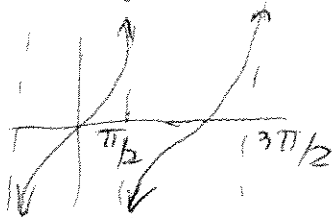
2. Compute $\lim_{x \rightarrow \pi/2^+} \tan x$. Justify your answer.

$\lim_{x \rightarrow \pi/2^+} \tan(x) = -\infty$. This is because $\tan(x) = \frac{\sin x}{\cos x}$.

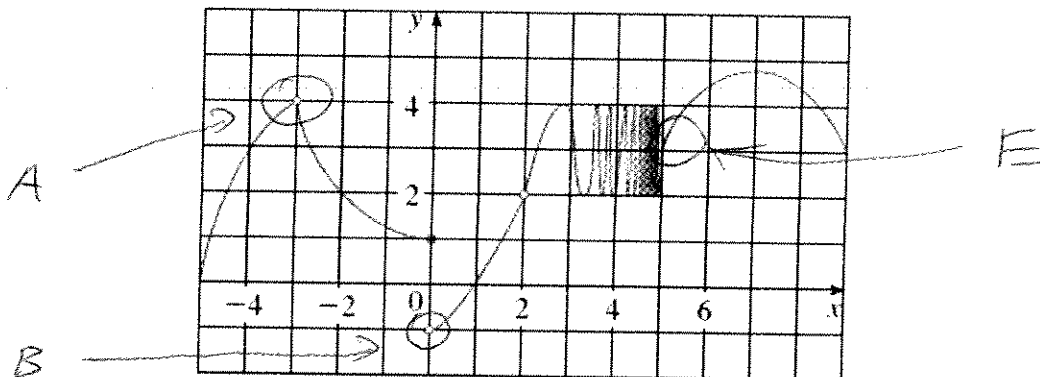
As $x \rightarrow \pi/2^+$, $\sin(x) \rightarrow 1$.

As $x \rightarrow \pi/2^+$, $\cos(x) \rightarrow 0$ and is negative.

Thus $\tan(x)$ is a large negative number as $x \rightarrow \pi/2^+$.



3. Compute the following limits from the graph.



a) $\lim_{x \rightarrow -3} f(x) = 4$

d) $\lim_{x \rightarrow 5^-} f(x)$ DNE

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

e) $\lim_{x \rightarrow 5^+} f(x) = 3$

c) $\lim_{x \rightarrow 0} f(x)$ DNE

(jump discontinuity)