**Questions for today?**

**I'll have Week 2 Written Posted later today.**

**Grade Reports Coming Soon (today or tomorrow)**

$(7,-4)$ lies on $f(x) = y = \frac{4}{6-x} = -\frac{4}{x-6}$

(a) **Find the slope of the secant line PQ correct to 6 decimal places for the following values of $x$:**

(i) 6.9

(ii) 6.99

(iii) 6.9999

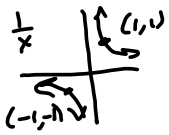
(iv) 6.99999

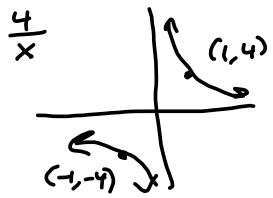
(v) 7.1

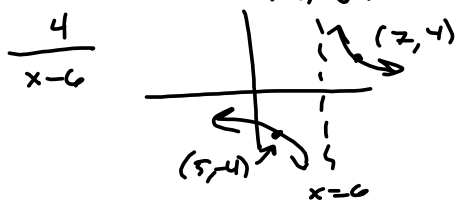
(vi) 7.01

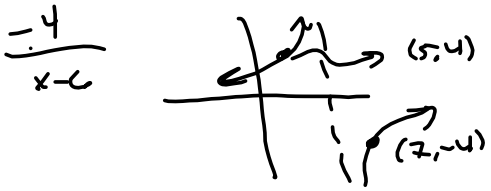
(vii) 7.001

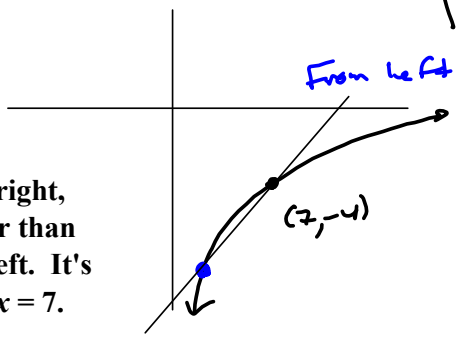
(viii) 7.0001



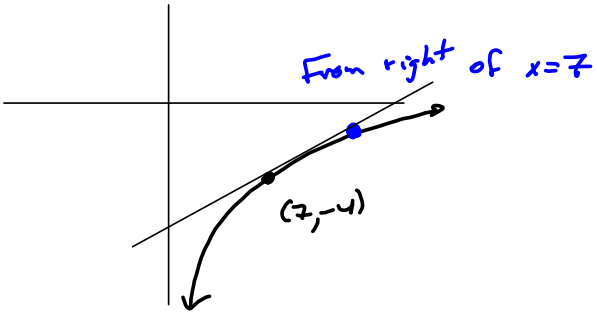




**Coming in from the right, the slopes are smaller than coming in from the left. It's steeper to the left of $x = 7$.**

Conclude $m_{tan}$ @ $x=7$ is $m_{tan} = 4$



**Using Desmos to compute a bunch of slopes. The idea is to come closer and closer to x = 7 to come closer and closer to the actual slope of the curve.**

$f(x) = \frac{4}{6-x}$

$\frac{(f(6.9)-f(7))}{6.9-7}$ = 4.44444444444

$\frac{(f(6.99)-f(7))}{6.99-7}$ = 4.0404040404

$\frac{(f(6.9999)-f(7))}{6.9999-7}$ = 4.00040004

Aiming for $f'(7)$ for this function.

$\frac{4}{6-x} = f(x)$. Aiming @

$\frac{f(7+h)-f(7)}{h} = \frac{\frac{4}{6-(7+h)} - \frac{4}{6-7}}{h} = \frac{\frac{4}{-1-h} - \frac{4}{-1}}{h}$

$= \frac{-\frac{4}{1+h} + \frac{4}{1}}{h} = \frac{\frac{-4+4(1+h)}{1+h}}{h} = \frac{-4+4+4h}{1+h} = \frac{4h}{1+h}$

$= \frac{1}{h}\left[\frac{4h}{1+h}\right] = \frac{4}{1+h}$ $h \to 0$ $\frac{4}{1} = m_{tan}$

By hand (ugh!)

$\frac{f(x_2)-f(x_1)}{x_2-x_1} = \frac{f(6.9)-f(7)}{6.9-7} = \frac{\frac{4}{6-6.9} - \frac{4}{6-7}}{6-7} = \frac{\frac{4}{-.9} - \frac{4}{-1}}{-1}$

$= \frac{4}{.9} - \frac{4}{1} = \frac{4-4(.9)}{.9} = \frac{4(1-.9)}{.9} = \frac{4(.1)}{.9} = \frac{.4}{.9} = \frac{4}{9}$

$\approx .444444$

$$\begin{array}{r} .44\ldots \\ 9\overline{)\,4.0000} \\ 3.6 \\ \hline .4000 \end{array}$$