STUDENT NAME:

Calculus 1550, section 6. Tuesday, February 17, 2004. Sixth quiz.

Let

$$f(x) = \frac{15x}{4x^2 - 1} + 1 - x$$

1. [1 point] Where is $f(x)$ discontinuous?

rational functions are continuous on their domains. $f(x)$ is defined if $4x^2 \neq 1$, ie $4x^2 \neq 1/4$ ie $x \neq \pm 1/2$

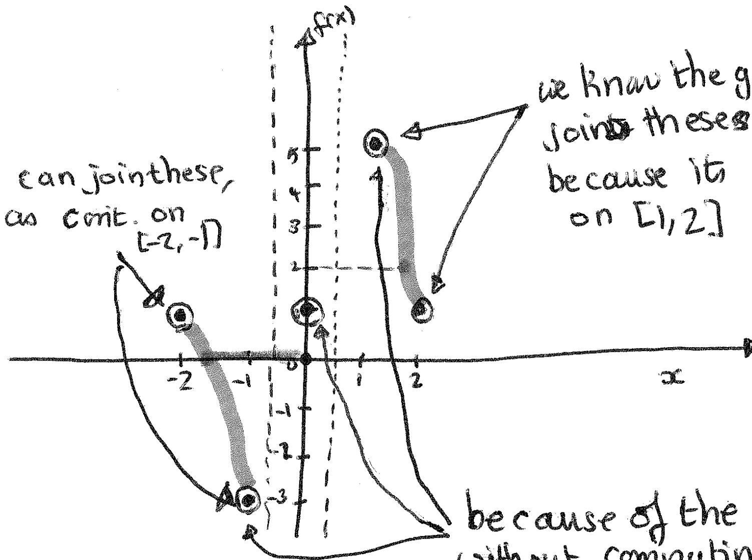
so $f(x)$ is discontinuous at $1/2$ & $-1/2$

2. [4 points] Fill in the following table:

x	$f(x)$
-2	$\frac{15(-2)}{16-1} + 1 + 2 = -2 + 1 + 2 = \boxed{1}$
-1	$\frac{(-1)15}{3} + 1 + 1 = -5 + 2 = \boxed{-3}$
0	$0 + 1 - 0 = \boxed{1}$
1	$\frac{15}{4-1} + 1 - 1 = 5$ $\boxed{5}$
2	$\frac{15 \times 2}{16-1} + 1 - 2 = 2 + 1 - 2$ $\boxed{1}$

can jointhese, as cont. on [-2,-1]

we know the graph joins theses points, because its continuous on [1,2]



because of the discontinuity, without computing more data, or using other results, we don't know what happens on [-1,0] & [0,1]

For the following question, you may find it helpful to sketch a graph, (space provided above) plotting the points found in the table, and indicating the vertical asymptotes.

3. [5 points] Which of the intervals $[-2, -1]$, $[-1, 0]$, $[0, 1]$, $[1, 2]$ does the intermediate value theorem tell us

a) contains a solution to $f(x) = 0$?

$[-2, -1]$

b) Contains a solution to $f(x) = 2$?

$[1, 2]$

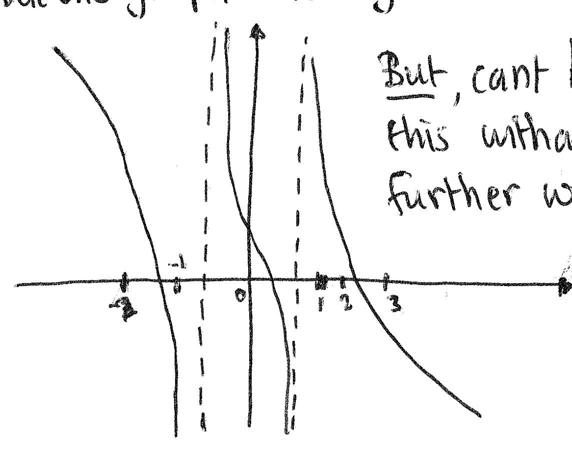
with more work, is also solution to $f(x) = 0$ on $[0, 1]$, (and with $x > 2$)

and solution to $f(x) = 2$ on $[-1, 0]$, and with $x < -2$

- but you are not expected to give these from the data computed.

Note, from the data computed, & intermediate value theorem, we can't say any more about this function.

but the graph actually looks like:



But, cant know this without further work.