Today's Plan:

Learning Target (standard): I will discuss the continuity of a function.

Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make neccessary corrections to their own work, take notes over new material and complete practice problems over new concepts.

Teacher will: Provide practice problems over previous concepts, check homework problems for accuarcy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

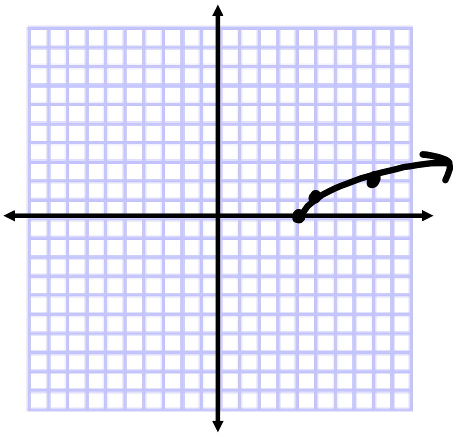
Assessment: Board work, homework check and homework assignment

Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.

Discuss the continuity:

$$f(x) = \sqrt{x-4}$$

$x-4 \geq 0$
$x \geq 4$



1) D: $\{x \mid x \geq 4\}$

2) Continuous on $(4, \infty)$

3) Domain Issue on $(-\infty, 4)$

a. $f(4) = 0$

b. $\lim_{x\to 4^-} f(x) = \text{DNE}$

$\lim_{x\to 4^+} f(x) = 0$

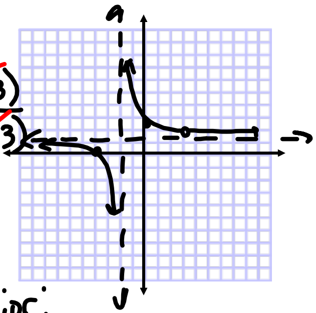
$\therefore \lim_{x\to 4} f(x) = \text{DNE}$

c. $f(4) \neq \lim_{x\to 4} f(x)$

4) $\therefore$ Since the domain of f(x) is $\{x \mid x \geq 4\}$ there is a domain issue on $(-\infty, 4)$. Every x in the domain of f(x) has a y-value, has left & right-hand limits except x=4, and the y-value & limits are equal. There are no y-values for any x-values less than 4.

Discuss the continuity:

$$f(x)=\frac{x^2+x-12}{x^2-x-6}=\frac{(x+4)\cancel{(x-3)}}{(x+2)\cancel{(x-3)}}$$



$f(x)=\frac{x+4}{x+2}$

D: $\{x \mid x \neq -2, 3\}$

Hole: $(3, \frac{7}{5})$

I_x: $(-4, 0)$

I_y: $(0, 2)$

End Behavior:

$\lim_{x\to\infty} \frac{\frac{x}{x}+\frac{4}{x}}{\frac{x}{x}+\frac{2}{x}} = \lim_{x\to\infty} \frac{1+\frac{4}{x}}{1+\frac{2}{x}} = \frac{1+0}{1+0} = 1$

$\lim_{x\to-\infty} \frac{1+\frac{4}{x}}{1+\frac{2}{x}} = \frac{1+0}{1+0} = 1$ $\therefore$ HA: $y=1$

intersects? DNI

$1=\frac{x+4}{x+2}$

$x+2=x+4$

$2\neq 4$

Asymptotic Behavior:

VA: $x=-2$

$\lim_{x\to-2^-} f(x)=-\infty$ $\lim_{x\to-2^+} f(x)=\infty$

Continuity:

1) D: $\{x \mid x\neq -2, 3\}$

2) Continuous on $(-\infty,-2)\cup(-2,3)\cup(3,\infty)$

3) Infinite/Essential Discontinuity @ $x=-2$

Removeable Discontinuity @ $x=3$

a. $f(-2)=$ undefined

b. $\lim_{x\to-2^-} f(x)=-\infty$

$\lim_{x\to-2^+} f(x)=\infty$ $\therefore \lim_{x\to-2} f(x)=$ DNE

c. $f(-2)\neq \lim_{x\to-2} f(x)$

$\therefore$ Since $f(-2)$ is undefined and the right-hand & left-hand limits are infinite, there is an essential/infinite discontinuity @ $x=-2$.

a. $f(3)=$ undefined

b. $\lim_{x\to3^-} f(x)=\frac{7}{5}$

$\lim_{x\to3^+} f(x)=\frac{7}{5}$

$\therefore \lim_{x\to3} f(x)=\frac{7}{5}$

c. $f(3)\neq \lim_{x\to3} f(x)$

$\therefore$ Since $f(3)$ is undefined and the left-hand & right-hand limits are equal & not infinite, there is a removable discontinuity @ $x=3$.

- Limit Packet: Set 2

  #16,22,23,24,26,29,30,31,33,35

Write the Intermediate Value Theorem and then describe in your own words the meaning of it. Provide a graphical example to support your description.