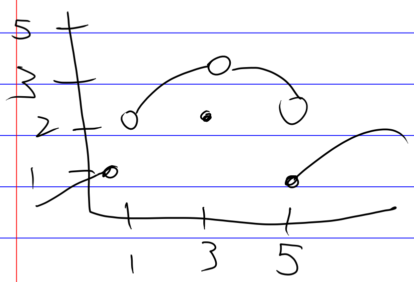
Recitation 04

excel section starts next week

2.4 #13

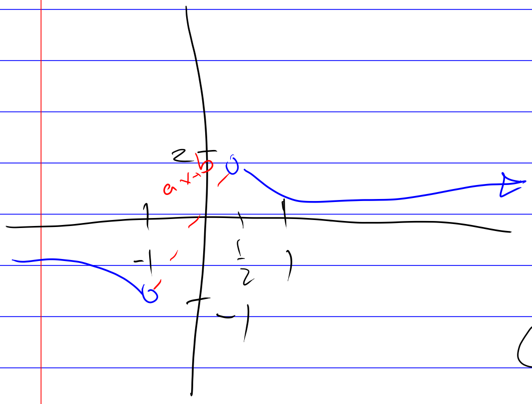


g has removable disc @ $x=3$

$g(x)=y$ $\qquad$ $g(3)=4.5$

2.4 #59

$$f(x)=\begin{cases} x^{-1}, & x<-1 \\ ax+b, & -1\le x\le\frac{1}{2} \\ x^{-1}, & x>\frac{1}{2} \end{cases}$$



$x=-1:\ -a+b=-1$

$x=\frac{1}{2}:\ \frac{1}{2}a+b=2$

$b=a-1$ $\quad$ $b=2-1=1$

$\frac{1}{2}a+a-1=2$

$\frac{3}{2}a=3$

$a=2$

$$\boxed{ax+b=2x+1}$$

2.4 #43

$$f(x) = \tan^2 x = \tan x * \tan x = \frac{\sin x}{\cos x} * \frac{\sin x}{\cos x}$$

Continuous where $\cos x \neq 0$

$x \neq \frac{\pi}{2} + \pi k$; k is an integer

2.5 #15

$$\lim_{t\to 0} \frac{4^{2t}-1}{4^t-1} \to \frac{4^{2\cdot 0}-1}{4^0-1} = \frac{1-1}{1-1} = \frac{0}{0}$$

indeterminate form

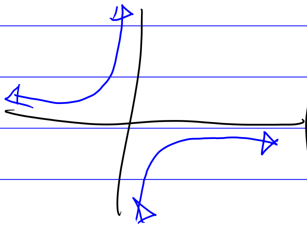
$$\lim_{t\to 0} \frac{(4^t+1)\cancel{(4^t-1)}}{\cancel{4^t-1}} = \lim_{t\to 0} 4^t+1 = 4^0+1 = 1+1 = \boxed{2}$$

2.5 #21

$$\lim_{h\to 0} \frac{\sqrt{2+h}-2}{h} \to \frac{\sqrt{2+0}-2}{0} = \frac{-\text{something}}{0}$$

not indeterminate.

"close" to $h=0$ looks like $\frac{\sqrt{2}-2}{h}$, numerator < 0



$$\boxed{\begin{aligned} \lim_{h\to 0^+} \frac{\sqrt{2+h}-2}{h} &= -\infty \\ \lim_{h\to 0^-} \frac{\sqrt{2+h}-2}{h} &= \infty \end{aligned}}$$

2.5#19

$$\lim_{h\to 0} \frac{\frac{1}{(h+2)^2} - \frac{1}{4}}{h} = \lim_{h\to 0} \frac{\frac{4-(h+2)^2}{4-(h+2)^2}}{h}$$

$$\lim_{h\to 0} \frac{\cancel{4} - (h^2+4h+\cancel{4})}{4(h+2)^2} = \lim_{h\to 0} \frac{-h^2-4h}{4h(h+2)^2} =$$

$$\lim_{h\to 0} \frac{\cancel{h}(-h-4)}{4\cancel{h}(h+2)^2} = \lim_{h\to 0} \frac{-h-4}{4(h+2)^2} = \frac{0-4}{4(2)^2} =$$

$$\boxed{-\frac{1}{4}}$$

2.5#25

$$\lim_{x\to 4} \left(\frac{1}{\sqrt{x}-2} - \frac{4}{x-4} \right) =$$

$$x-4 = (\sqrt{x})^2 - 2^2 = (\sqrt{x}+2)(\sqrt{x}-2)$$

$$\lim_{x\to 4} \frac{\sqrt{x}+2-4}{x-4} = \lim_{x\to 4} \frac{\sqrt{x}-2}{x-4} = \lim_{x\to 4} \frac{\cancel{\sqrt{x}-2}}{(\sqrt{x}+2)\cancel{(\sqrt{x}-2)}}$$

$$\lim_{x\to 4} \frac{1}{\sqrt{x}+2} = \frac{1}{\sqrt{4}+2} = \boxed{\frac{1}{4}}$$
