$$\lim_{x\to 3} \underbrace{\frac{x^2-6x+9}{|x-3|}} = \boxed{0}$$

$$x-3=0 \rightarrow x=3$$

$x>3$

$$\rightarrow \frac{x^2-6x+9}{x-3} \rightarrow \frac{(x-3)^2}{x-3} \rightarrow x-3$$

$$\lim_{x\to 3} x-3 \rightarrow \boxed{0}$$

$x<3 \rightarrow$

$$\frac{x^2-6x+9}{\boxed{-(x-3)}} \rightarrow \frac{(x-3)^2}{-(x-3)} \rightarrow -(x-3)$$

$$\lim_{x\to 3} -(x-3) \rightarrow \boxed{0}$$

$|x-3|$ $\quad x=3$

$$\frac{x^2-6x+9}{x-3}$$

$$\begin{cases} \underline{x>3} \\ \\ \underline{x<3} \end{cases}$$

$$\lim_{x\to 0} 4x^2 \sin\left(\frac{1}{x\cos(x)}\right) = 0$$

$$0 \le \lim_{x\to 0} \cdots \le 0$$

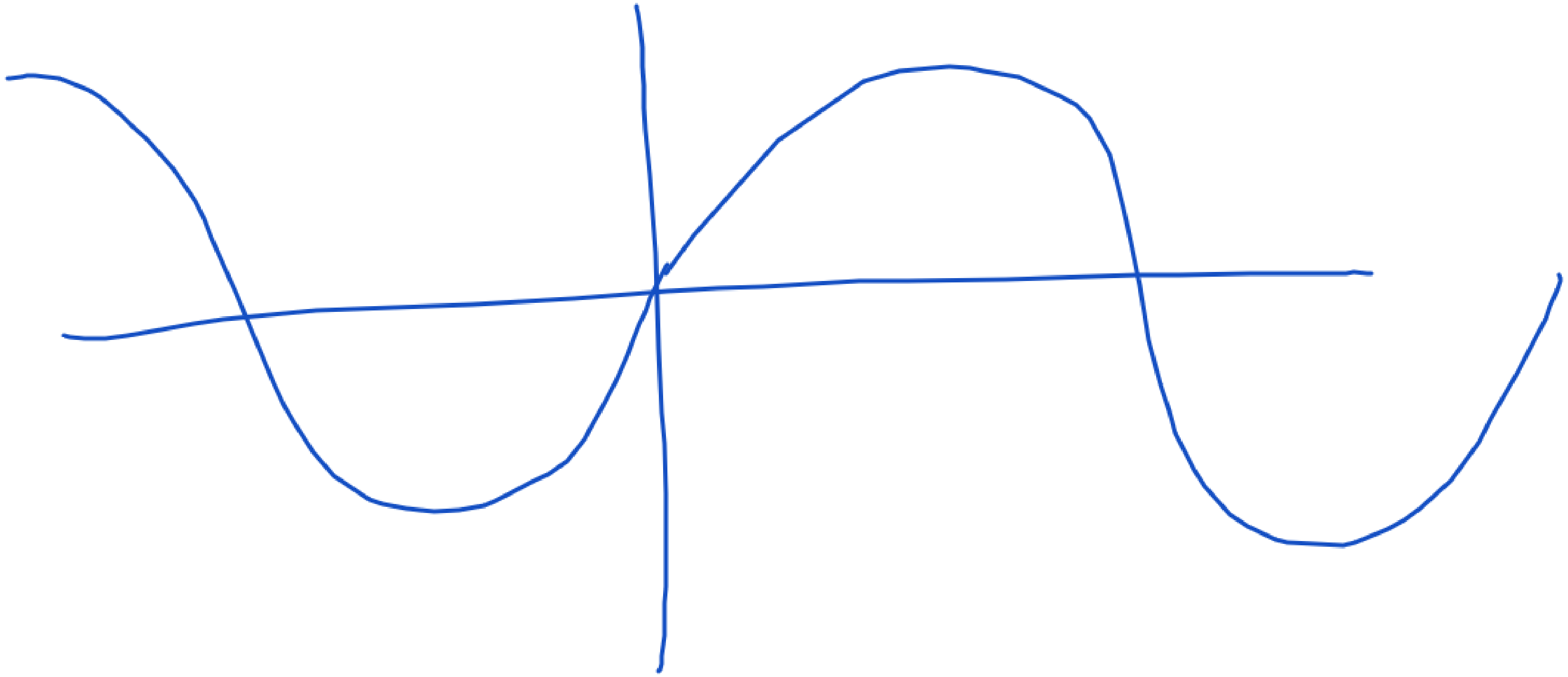
$$-1 \le \sin(x) \le 1$$

by the squeeze Thm.

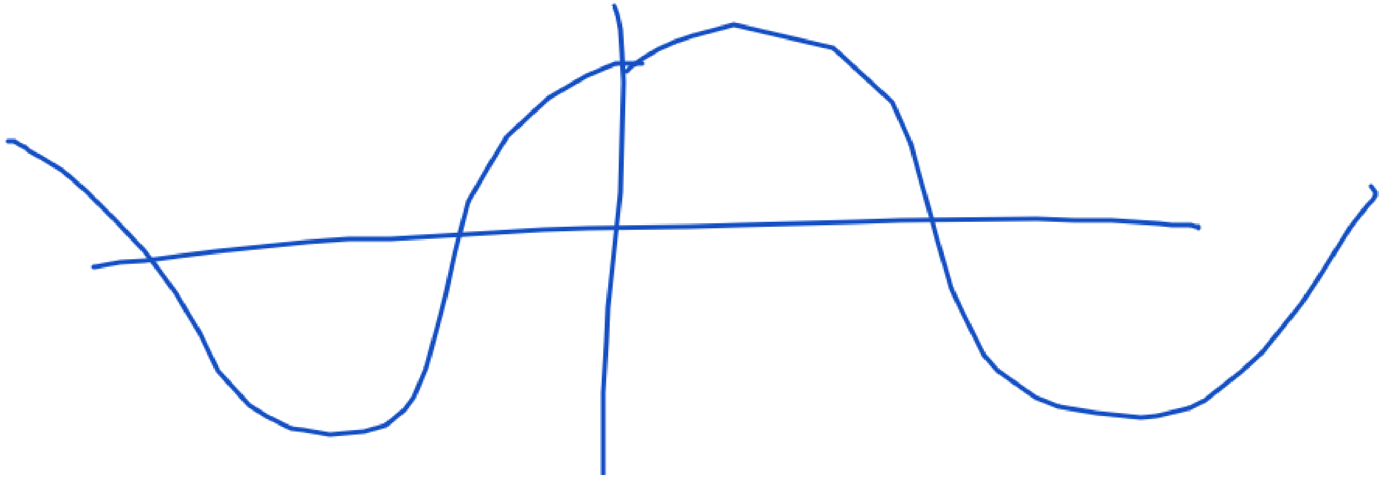
$$\left(-1 \le \sin\left(\frac{1}{x\cos(x)}\right) \le 1\right) 4x^2$$

$$\left(-4x^2 \le 4x^2 \sin\left(\frac{1}{x\cos x}\right) \le 4x^2\right) \lim_{x\to 0}$$

$$\underbrace{\lim_{x\to 0} -4x^2}_{=0} \le \underline{\lim_{x\to 0} 4x^2 \sin\left(\frac{1}{x\cos x}\right)} \le \underbrace{\lim_{x\to 0} 4x^2}_{=0}$$



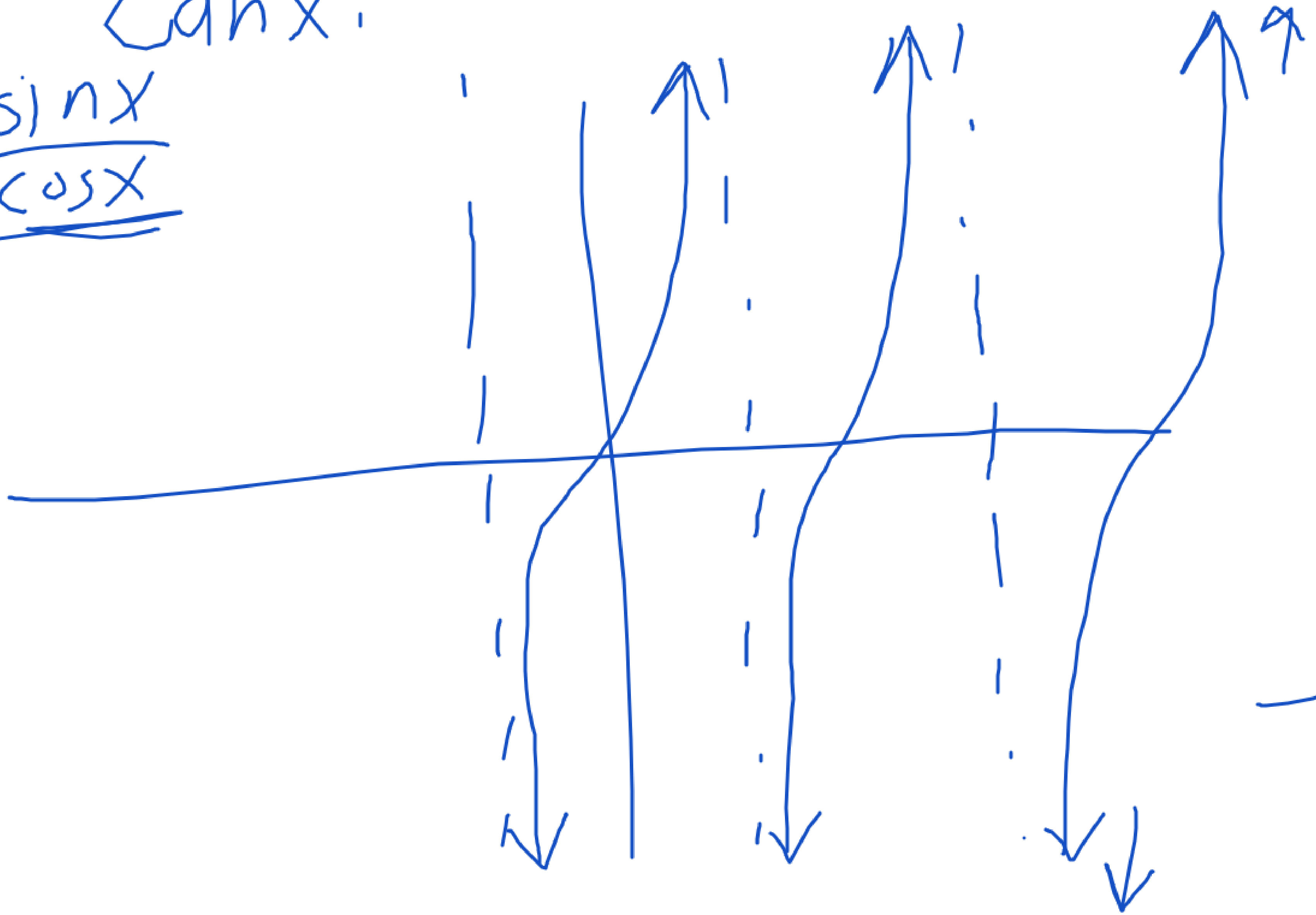
$-1 \le \sin x \le 1$



$-1 \le \cos x \le 1$

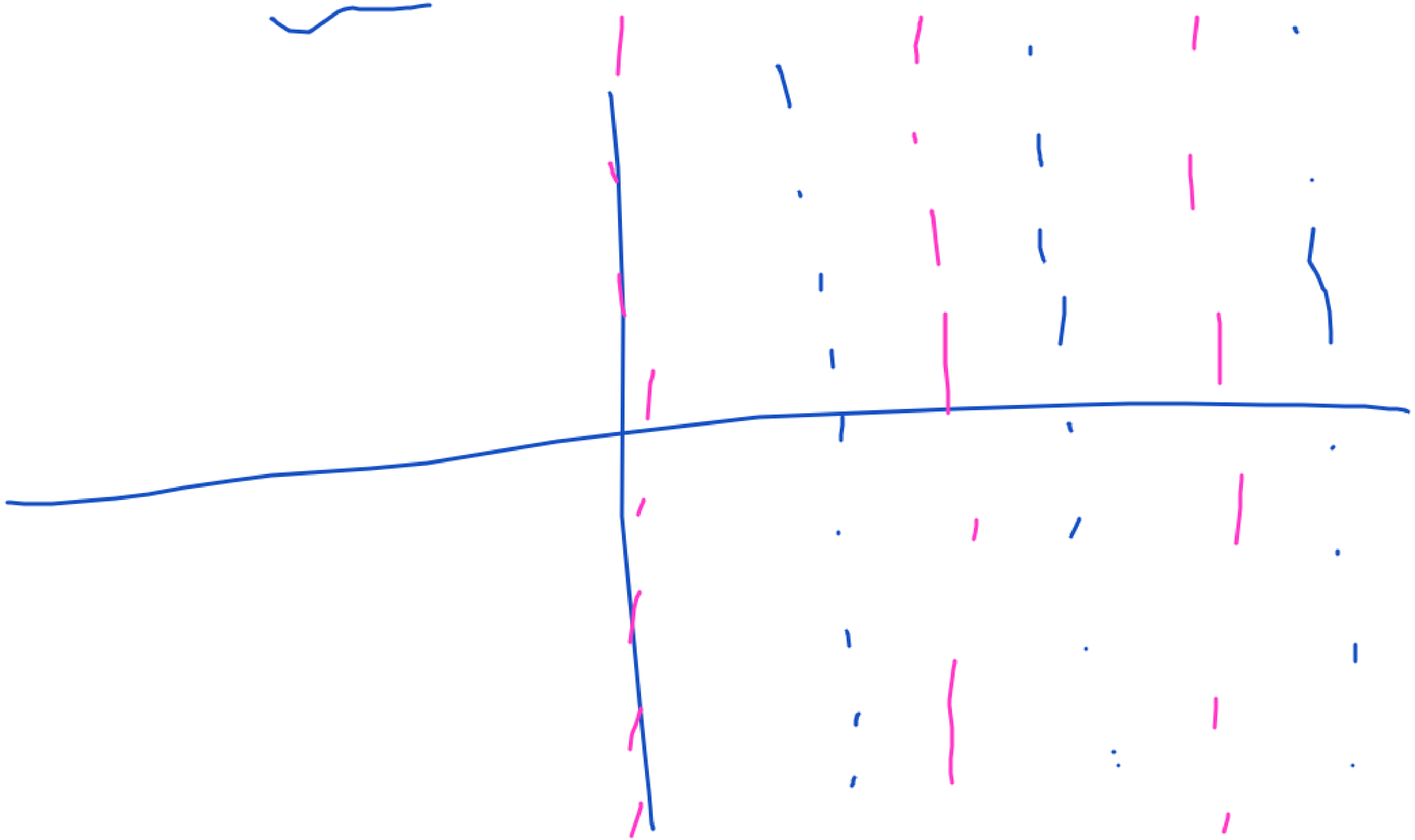
tan x:

$$\frac{\sin x}{\cos x}$$



~~Sq. thm~~

$\sec = \frac{1}{\cos x}$ $\csc = \frac{1}{\sin x}$



HW 5 #5

$$\frac{y_2-y_1}{x_2-x_1}$$

$$s(t) = -16t^2 + 23t + 1$$

$$s(4.5) = -16(4.5)^2 + 23(4.5) + 1$$
$$= -16(20.25) + 103.5 + 1$$
$$= -324 + 103.5 + 1$$
$$= \boxed{-219.5}$$

$$\frac{s(b)-s(a)}{b-a}$$

$$\frac{s(4.5)-s(4)}{4.5-4}$$

$$\boxed{-113}$$

$$s(4) = -16(16) + 23(4) + 1$$
$$= -256 + 92 + 1 = \boxed{-163}$$

$$\frac{-219.5+163}{0.5} = \frac{-56.5}{0.5}$$

$s(t) = -16t^2 + 23t + 1$

in. vel. @ $t = 2$

$$\lim_{h \to 0} \frac{s(2+h) - s(2)}{h}$$

$v(t) = -32t + 23$

$-64 + 23 = \boxed{-41}$

$s(2+h) = -16(2+h)^2 + 23(2+h) + 1$

$= -16(4 + 4h + h^2) + 46 + 23h + 1$

$= \boxed{\cancel{-64} - 64h - 16h^2 + 23h + \cancel{47}}$

$s(2) = -16(4) + 47 = \boxed{\cancel{-64} + \cancel{47}}$

$$\lim_{h \to 0} \frac{-16h^2 - 41h}{h}$$

$$\lim_{h \to 0} \frac{\cancel{h}(-16h - 41)}{\cancel{h}}$$

$$\lim_{h \to 0} -16h - 41 = \boxed{-41}$$

Fall 2020 V.A

FRQ #3

$5\sqrt{x} - 2x - 2^x = 0$

D: $[0, \infty$

$[0, 1]$ by the IVT

$5(0) - 2(0) - 2^0 = -1$

$\boxed{\text{IVT}}$

1) cont.

2) $f(a) \leq 0$

$f(b) \geq 0$

$(0, \infty)$

$5(1) - 2(1) - 2^1$

$5 - 2 - 2 = \boxed{1}$

$5\sqrt{x}$ cont. on $[0,\infty)$

$-2x$ cont. everywhere

-2^x cont. everywhere

$5\sqrt{x}-2x-2^x$ is cont. on $[0,\infty)$

$[0,1]$

-0.5

the function has a solution on $[0,1]$ by the IVT because $f(0) < 0 < f(1)$ and the function is cont. on $[0,\infty)$ so is cont. on $[0,1]$