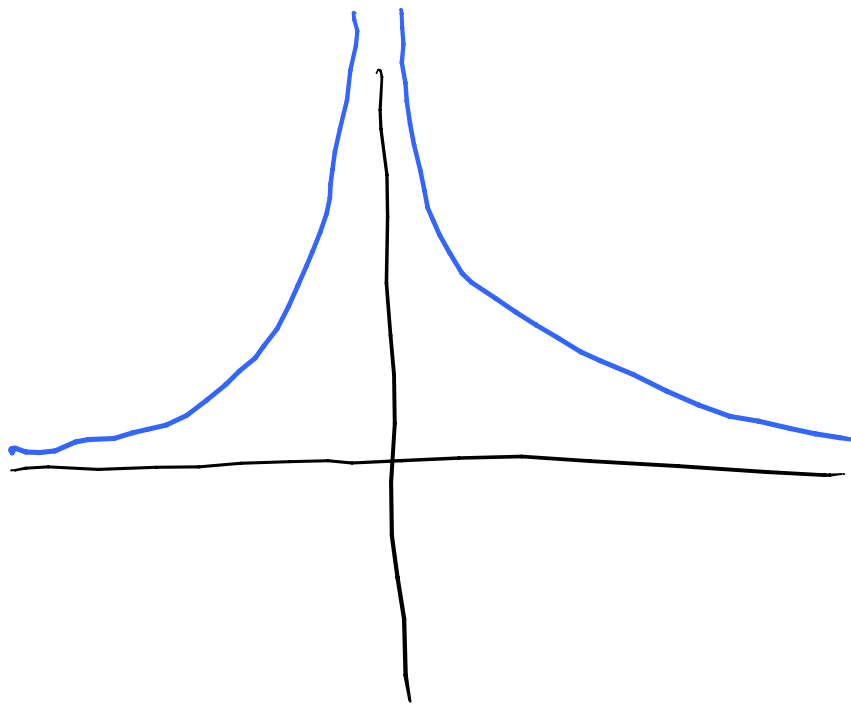


$$y = \frac{1}{x^2}$$



$$y = \frac{\sin x + 2x}{x}$$

Find horiz. and/or vert asymptotes.

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

$\rightarrow 2$

as $x \rightarrow \infty$

and as $x \rightarrow -\infty$.

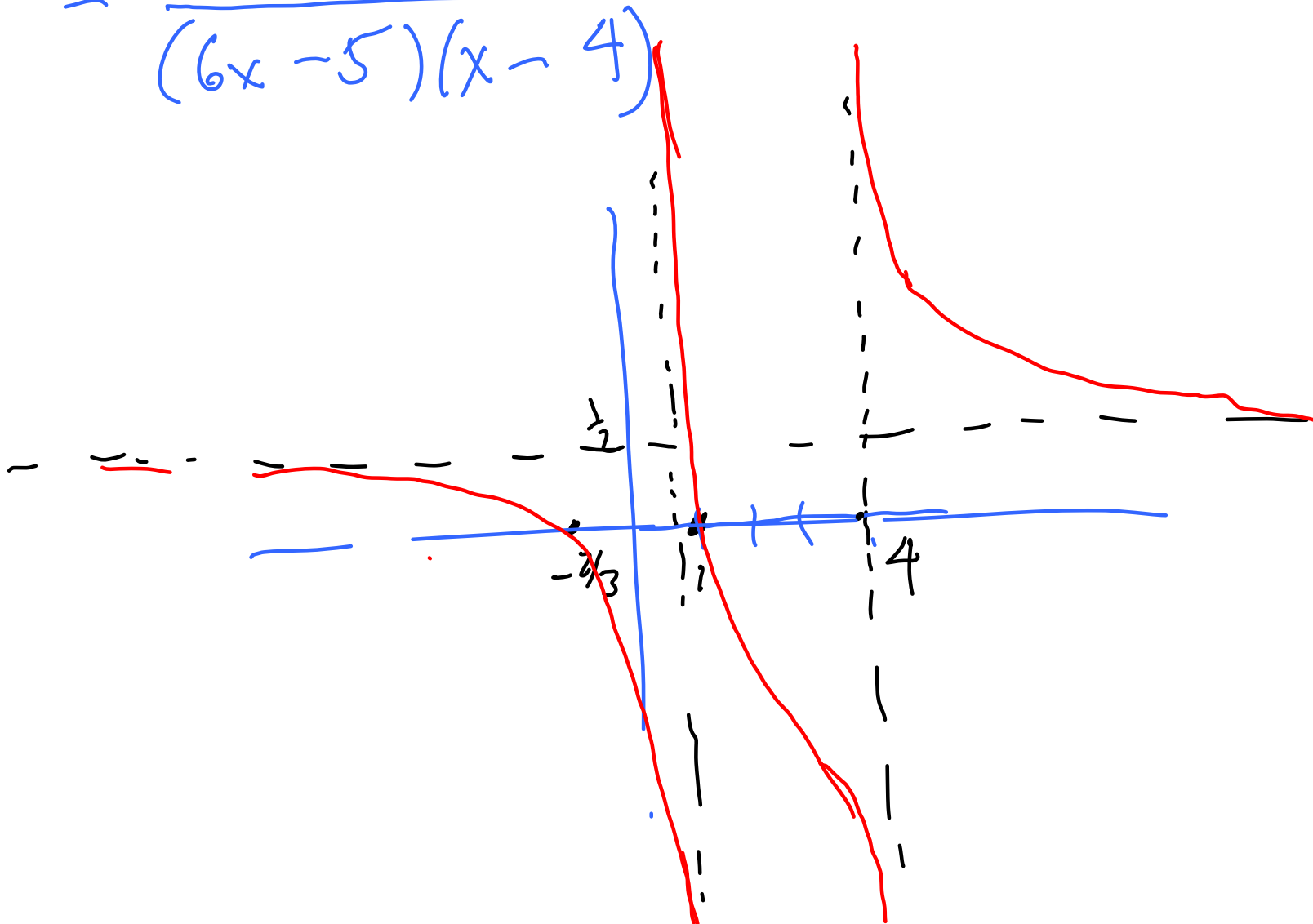
$\rightarrow 3$

as $x \rightarrow 0$

Find horizontal & vertical asymptotes
then graph

$$y = \frac{3x^2 - x - 2}{6x^2 - 29x + 20}$$

$$= \frac{(x-1)(3x+2)}{(6x-5)(x-4)}$$



$$\lim_{t \rightarrow \frac{\pi}{2}} \frac{\sqrt{\sin^2 t + 5\cos^2 t} - \sin t}{3\cos^2 t} =$$

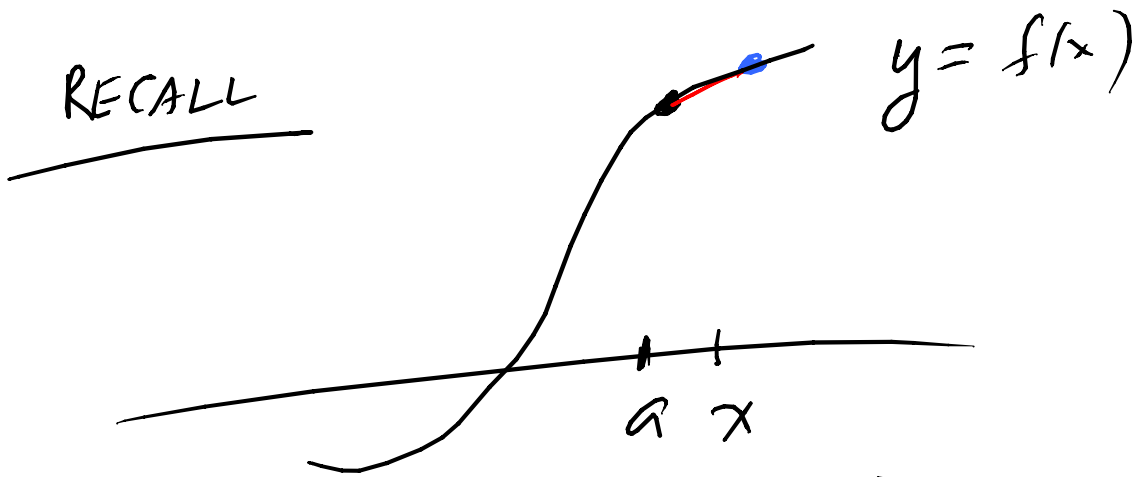
$$\frac{\sqrt{\sin^2 t + 5\cos^2 t} - \sin t}{3\cos^2 t} \cdot \frac{\sqrt{\sin^2 t + 5\cos^2 t} + \sin t}{\sqrt{\sin^2 t + 5\cos^2 t} + \sin t}$$

$$= \frac{\sin^2 t + 5\cos^2 t - \sin^2 t}{3\cos^2 t (\sqrt{\sin^2 t + 5\cos^2 t} + \sin t)}$$

$$= \frac{5}{3 (\sqrt{\sin^2 t + 5\cos^2 t} + \sin t)} \xrightarrow{t \rightarrow \frac{\pi}{2}} \frac{5}{6}$$

SECTION 2.7 DERIVATIVES & RATE OF CHANGE

RECALL



SLOPE OF SECANT (CHORD) FROM $(a, f(a))$ to $(x, f(x))$ is

$$\frac{f(x) - f(a)}{x - a}$$

(DIFFERENCE QUOTIENT)

SLOPE OF THE CURVE $y = f(x)$ at $x = a$ is

$$\lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a} = f'(a)$$

SAME AS $= \lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$

$$\begin{cases} x = a+h \\ x-a=h \end{cases}$$

OTHER NOTATION:

$$y = f(x)$$

$$\Delta x = \text{"CHANGE IN } x \text{"} = x - a$$

$$\Delta y = \text{"CHANGE IN } y \text{"} = f(x) - f(a)$$

$$\text{SO SLOPE AT } (a, f(a)) = \lim_{\Delta x \rightarrow 0} \frac{\Delta y}{\Delta x}$$

$A(t) =$ DISTANCE AT TIME t

$$A'(t) = \lim_{h \rightarrow 0} \frac{A(t+h) - A(t)}{h} = \text{(INSTANTANEOUS) VELOCITY AT TIME } t$$

= RATE OF CHANGE OF DISTANCE WITH RESPECT TO TIME

$$f'(a) = \lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a} = \text{"RATE OF CHANGE OF } f \text{ WITH RESPECT TO } x \text{ WHEN } x = a \text{"}$$

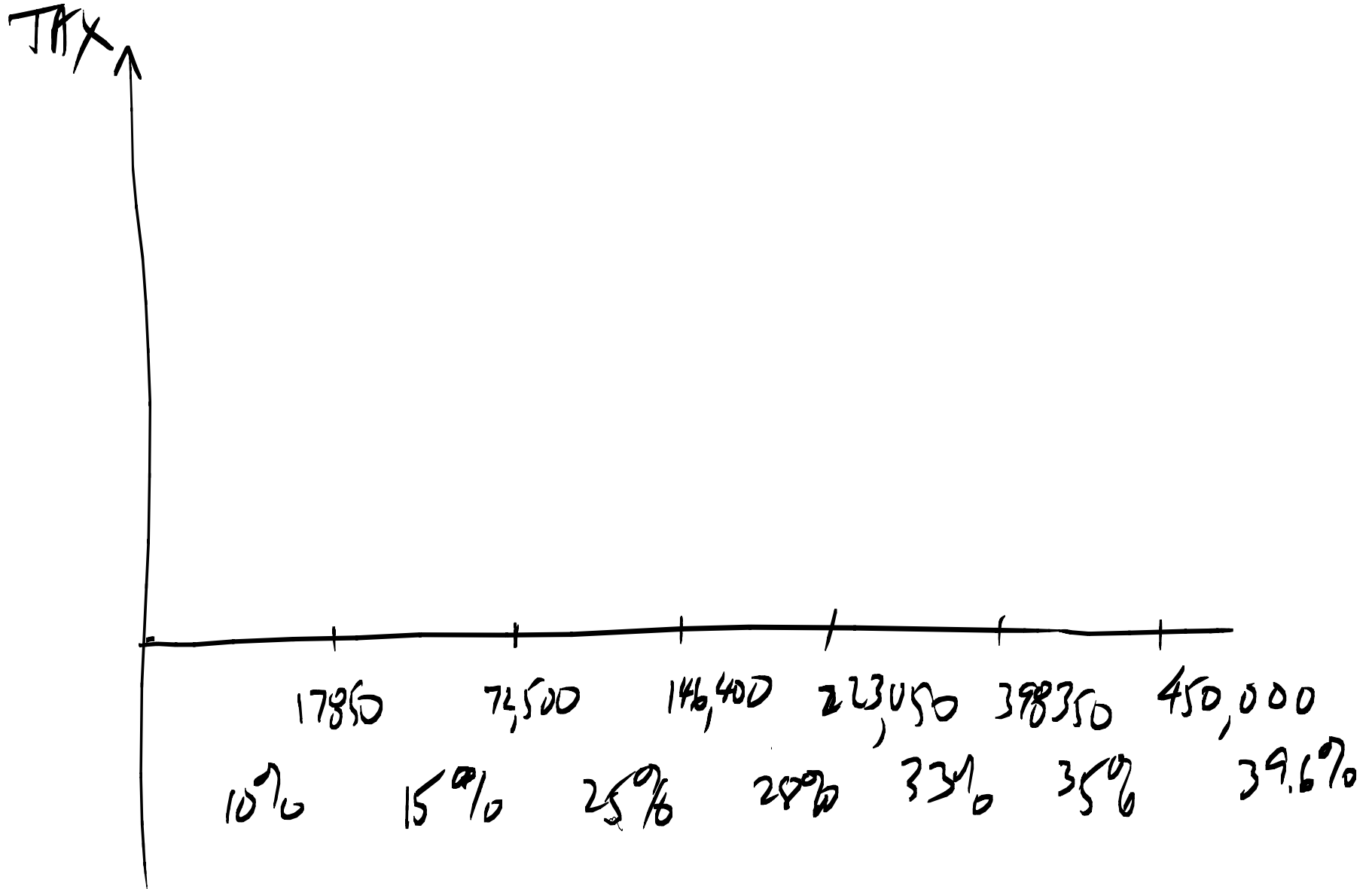
MULTI PART FUNCTION - TAX RATE SCHEDULE (IRS) (2013 JOINT)

TAX RATES: 10%, 15%, 25%, 28%, 33%, 35%, 39.6%

MULTI PART FUNCTION - TAX RATE SCHEDULE (IRS)

TAX RATES: 10%, 15%, 25%, 28%, 33%, 35%, 39.6%

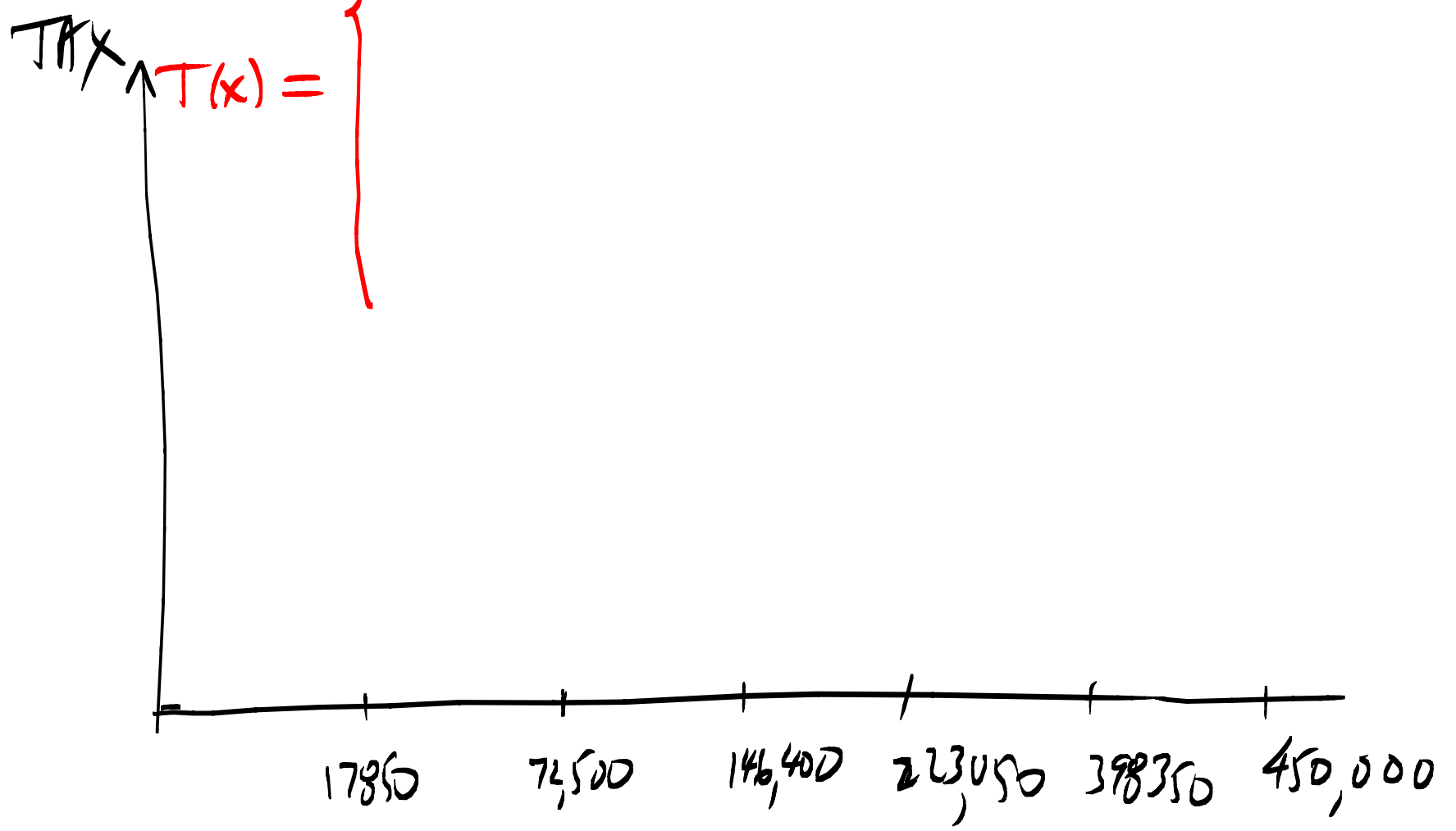
RATE OF CHANGE OF TAX WITH RESPECT TO INCOME



MULTI PART FUNCTION - TAX RATE SCHEDULE (IRS)

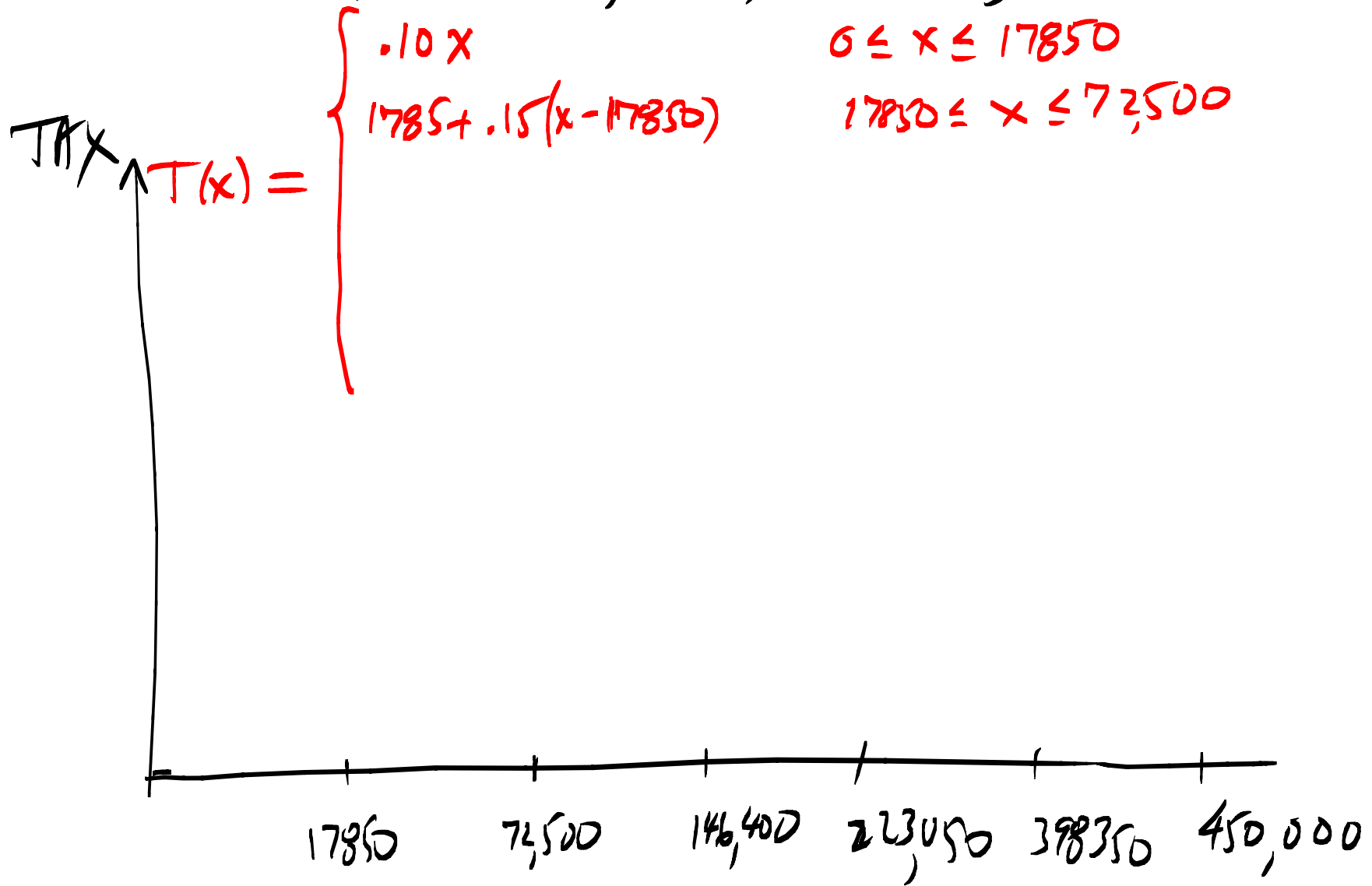
TAX RATES: 10%, 15%, 25%, 28%, 33%, 35%, 39.6%

$$\left. \begin{array}{l} \\ \\ \\ \\ \\ \\ \end{array} \right\} .10x \quad 0 \leq x \leq 17850$$



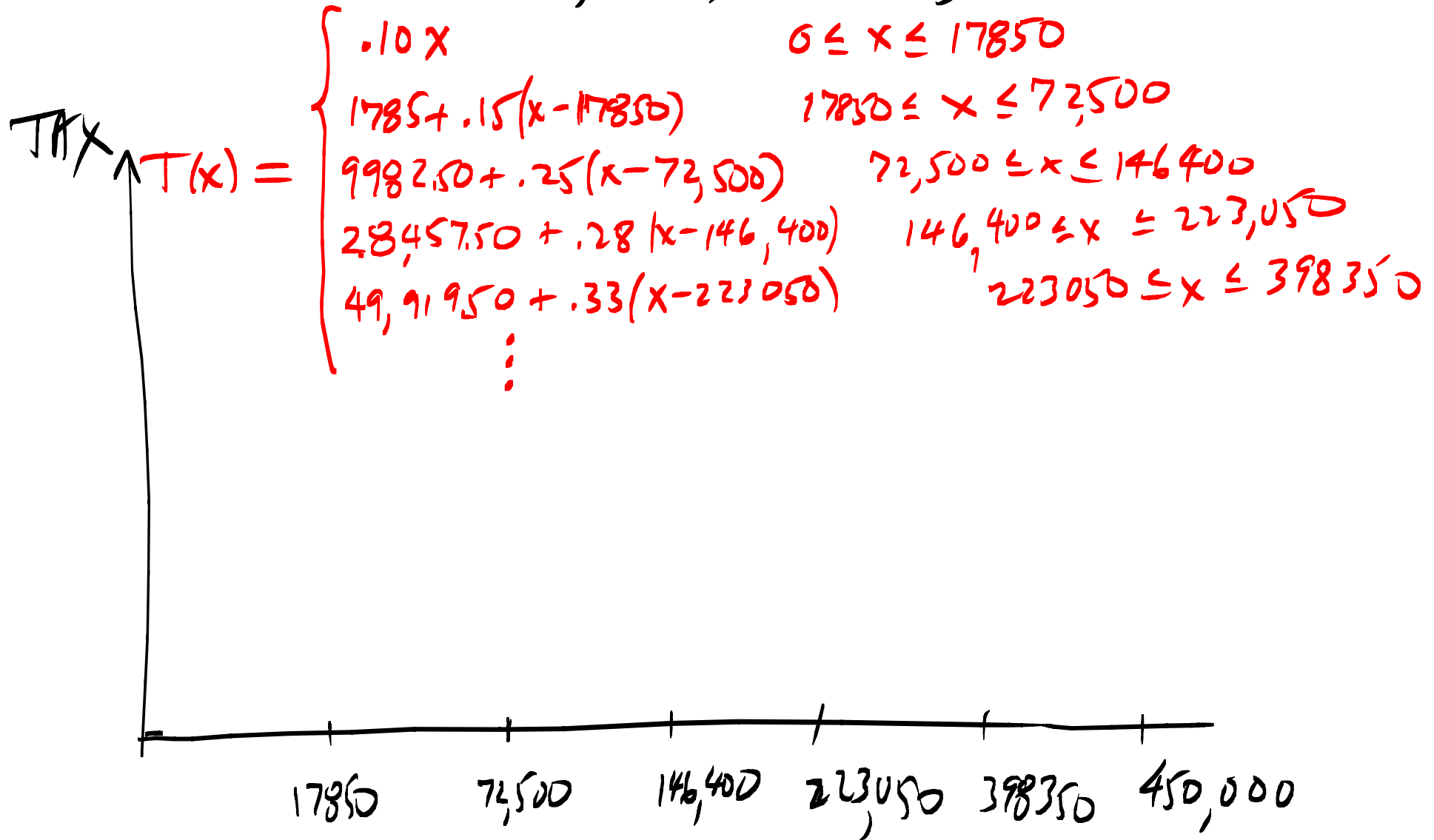
MULTI PART FUNCTION - TAX RATE SCHEDULE (IRS)

TAX RATES: 10%, 15%, 25%, 28%, 33%, 35%, 39.6%



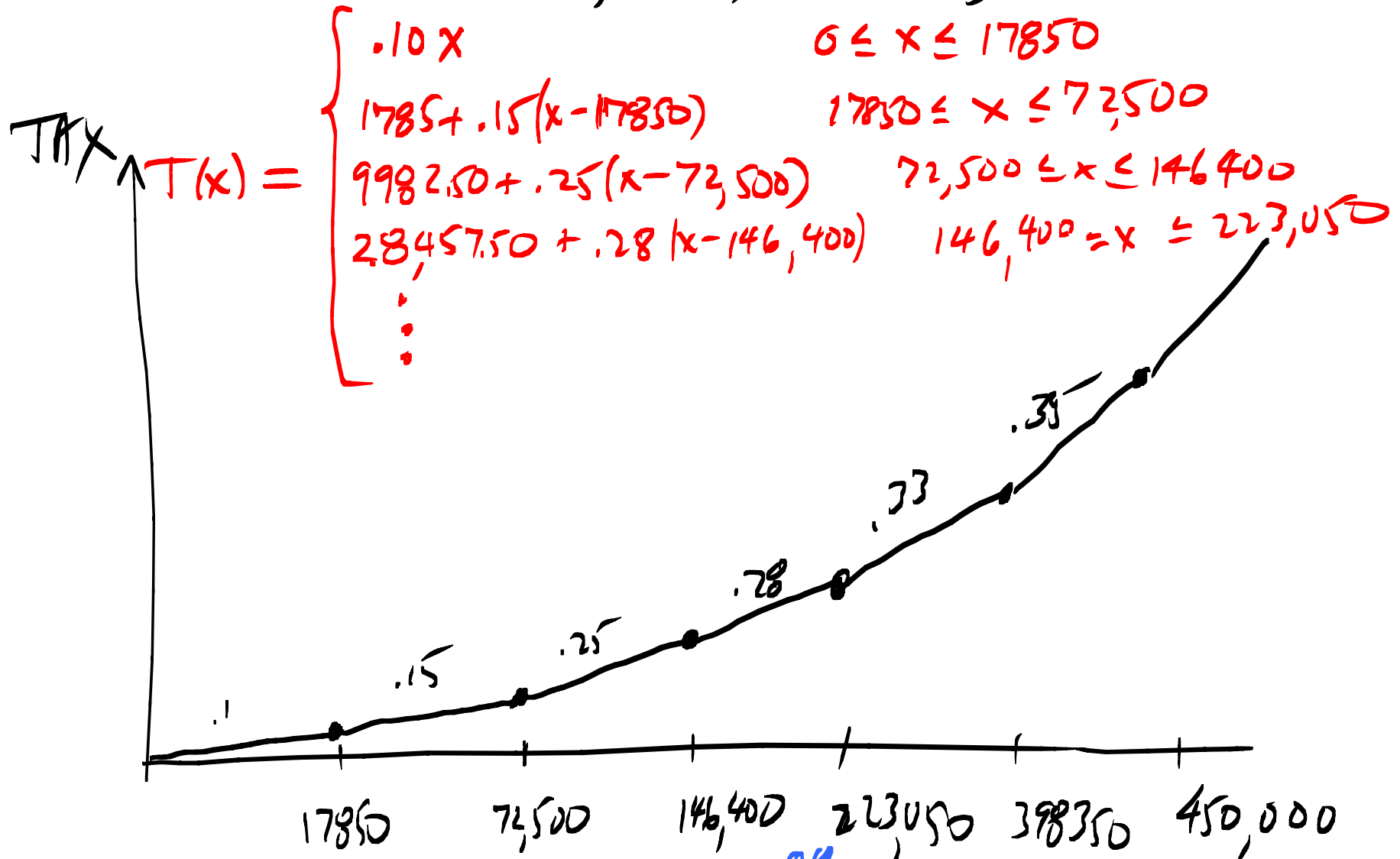
MULTI PART FUNCTION - TAX RATE SCHEDULE (IRS)

TAX RATES: 10%, 15%, 25%, 28%, 33%, 35%, 39.6%



MULTI PART FUNCTION - TAX RATE SCHEDULE (IRS)

TAX RATES: 10%, 15%, 25%, 28%, 33%, 35%, 39.6%



(MARGINAL) TAX RATE ON 150,000 = 28% TAX = 29,465.50

(AVERAGE) TAX RATE ON 150,000 = 19.6% $\frac{T(x)}{x}$