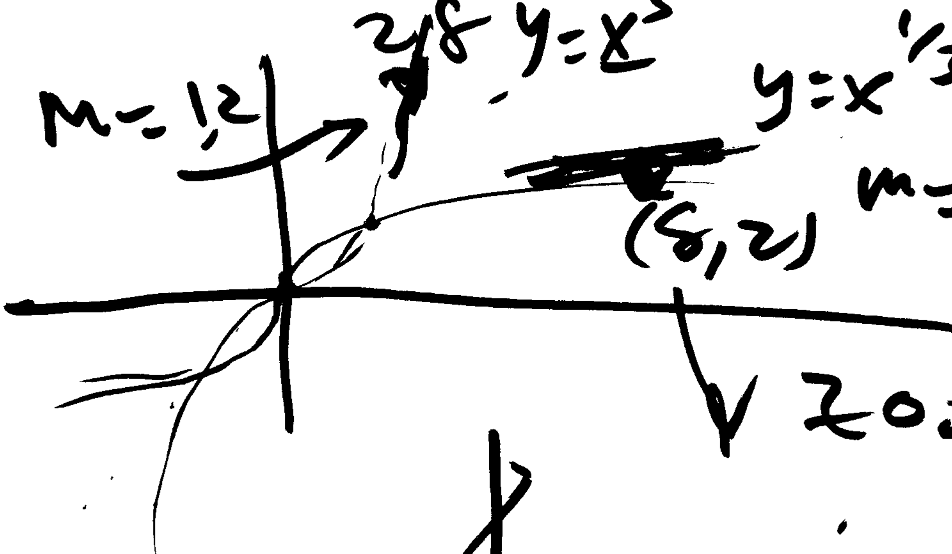
11/2

Approximate $\sqrt[3]{8.1} = \sqrt[3]{8+.1}$



$\frac{1}{3}x^{-2/3} = \frac{1}{3(x^{1/3})^2}$

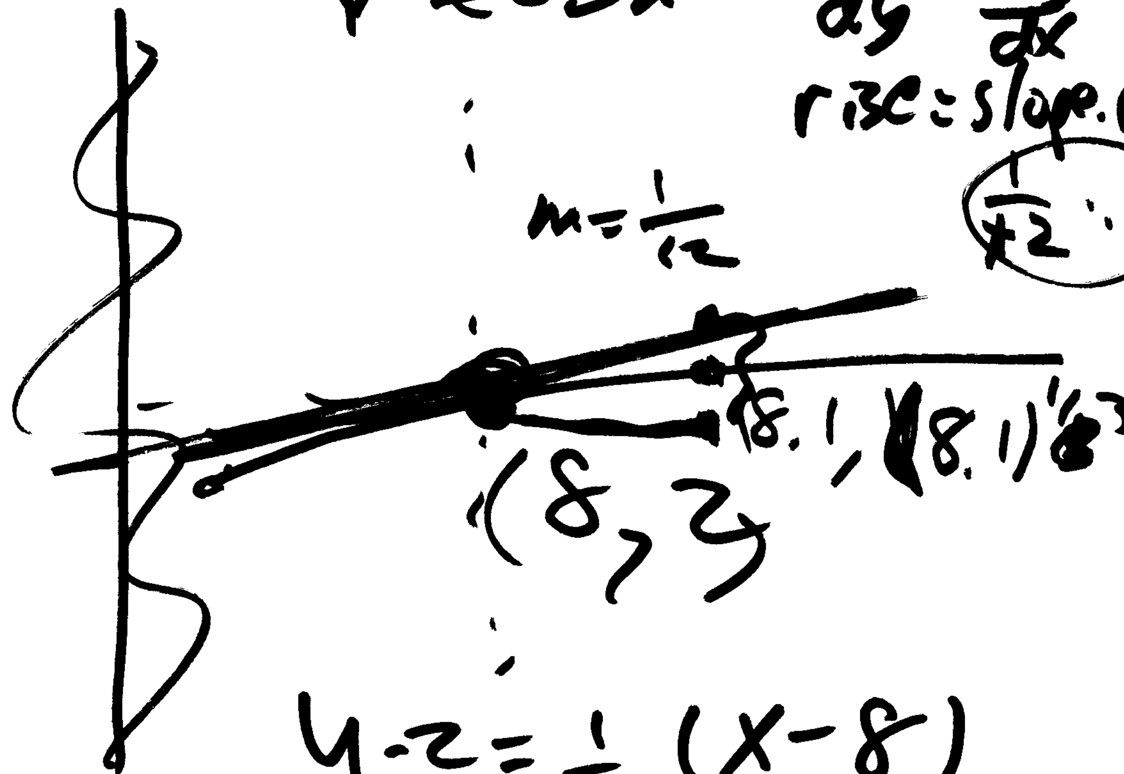
$m = 1/12$

Zoom

$dy \quad \frac{dy}{dx} \quad dx$

rise = slope · run

$\frac{1}{12} \cdot .1$

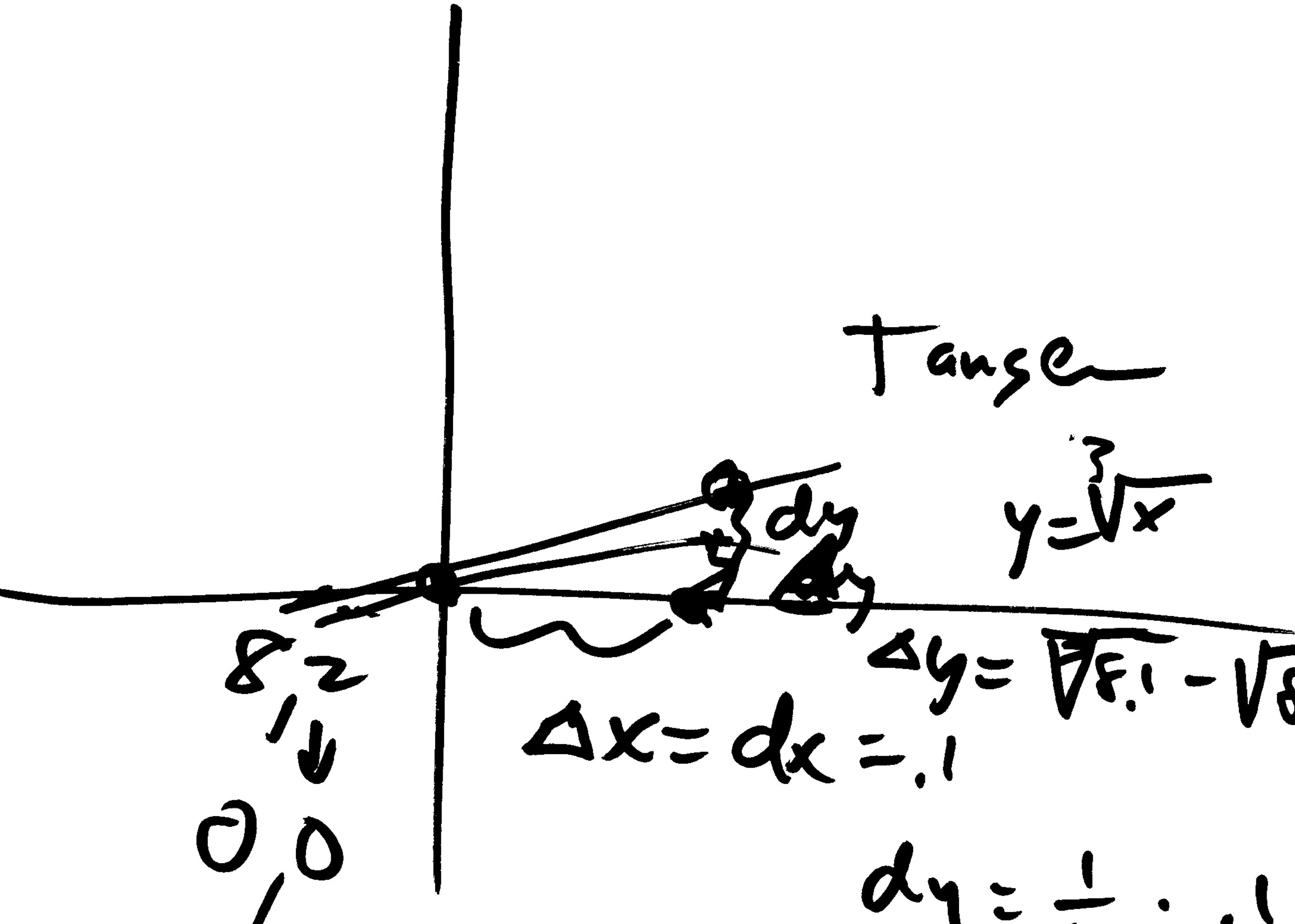


$$\underbrace{y-2}_{} = \underbrace{\frac{1}{12}}_{} \underbrace{(x-8)}_{\shortparallel}$$

$$dy = \frac{dy}{dx} \, dx$$

Tange

$y = \sqrt[3]{x}$



$\Delta y = \sqrt[3]{8.1} - \sqrt[3]{8}$

$\Delta x = dx = .1$

$dy = \frac{1}{12} \cdot .1$

$\underline{f'(8) \cdot \Delta x}$

$2 + \frac{1}{12} \cdot .1 = \underline{2.00833\ldots}$

$\sqrt[3]{8.1} = (8.1)^{1/3} = \underline{2.008298}$

$$b^{x+y} = b^x b^y = 1\cdot\underbrace{b\cdot b\cdots b}$$

$$2^{2+3} = 2^2\cdot 2^3$$

$$2^5 = 32 = 4\cdot 8$$

$$1\cdot\underbrace{2\cdot 2\cdot 2\cdot 2\cdot 2}_{5} = 1\cdot\underbrace{2\cdot 2}_{2}\cdot 1\cdot\underbrace{2\cdot 2\cdot 2}_{3}$$

$$\log_2(32) = \log_2(4\cdot 8)$$

$$\log_2(2^5) = \log_2(2^2) + \log_2(2^3)$$

$$5 = 2 + 3$$

$$2^{\log_2(2^5)} = 2^5 \qquad = \log_2(4) + \log_2(8)$$

The log of the product is the sum of the logs

The exponential of the sum is the product of the exponentials

$$10^2 \cdot 10^3 = 10^{2+3}$$

$$\log_{10}(100 \cdot 1000) = \log_{10}(100) + \log_{10}(1000)$$

$$\log_{10}(100 \cdot 100 \cdot 100 \cdot 100 \cdot 100)$$

$$= \log_{10}(100^5)$$

$$= \log_{10} 100 + \log_{10} 100 + \log_{10} 100 + \log_{10} 100 + \log_{10} 100$$

$$= 5 \log_{10}(100)$$

$$(10^2)(10^2)(10^2) = 10^{2+2+2} = 10^{3 \cdot 2}$$

$$b^x b^y = b^{x+y}$$

$$\log_b(xy) = \log_b(x) + \log_b(y)$$

$$(b^x)^y = b^{(x \cdot y)}$$

$$\log_b(x^y) = y \log_b x$$

$$\log_b\left(\frac{x}{y}\right) = \log_b(x y^{-1}) = \log_b x + \log_b y^{-1}$$

$$= \log_b x - 1 \log_b y$$

$$b^{\log_b x} = x$$

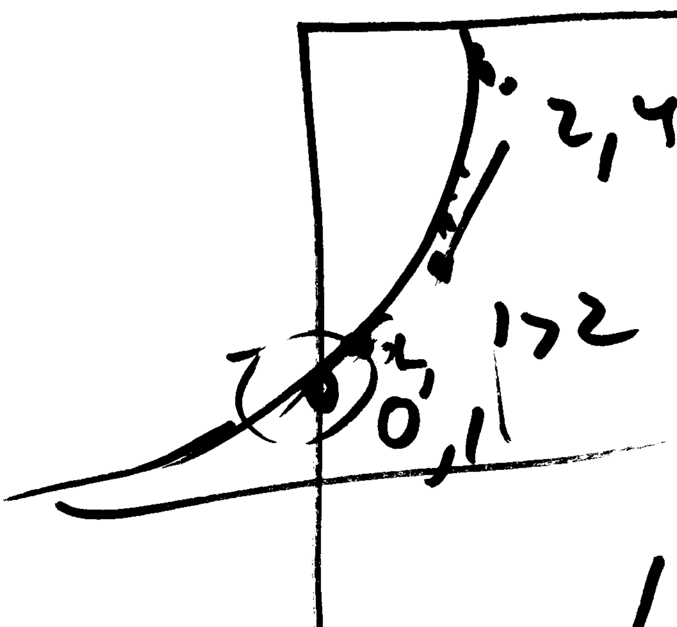
$$\log_b(b^x) = x$$

$f(x) = 2^x$

$x^y = \mathrm{pow}(x, y)$

$f'(x) \neq x \, 2^{x-1}$

$$= \lim_{h \to 0} \frac{2^{x+h} - 2^x}{h}$$



$$= \lim_{h \to 0} \frac{2^x \cdot 2^h - 2^x}{h}$$

$$= 2^x \lim_{h \to 0} \frac{2^h - 1}{h}$$

$$= f'(0) \cdot 2^x$$

$t=3 \quad y=5$

$t=7 \quad y=10$

$(3,5) \quad (7,10)$

$$y = 5 \cdot \left(\frac{10}{5}\right)^{\frac{t-3}{7-3}}$$

$$= 5 \cdot 2^{(t-3)/4}$$

$$= 5\left(e^{\log_e 2}\right)^{(t-3)/4} = \underline{5e^{\frac{(t-3)\ln 2}{4}}}$$