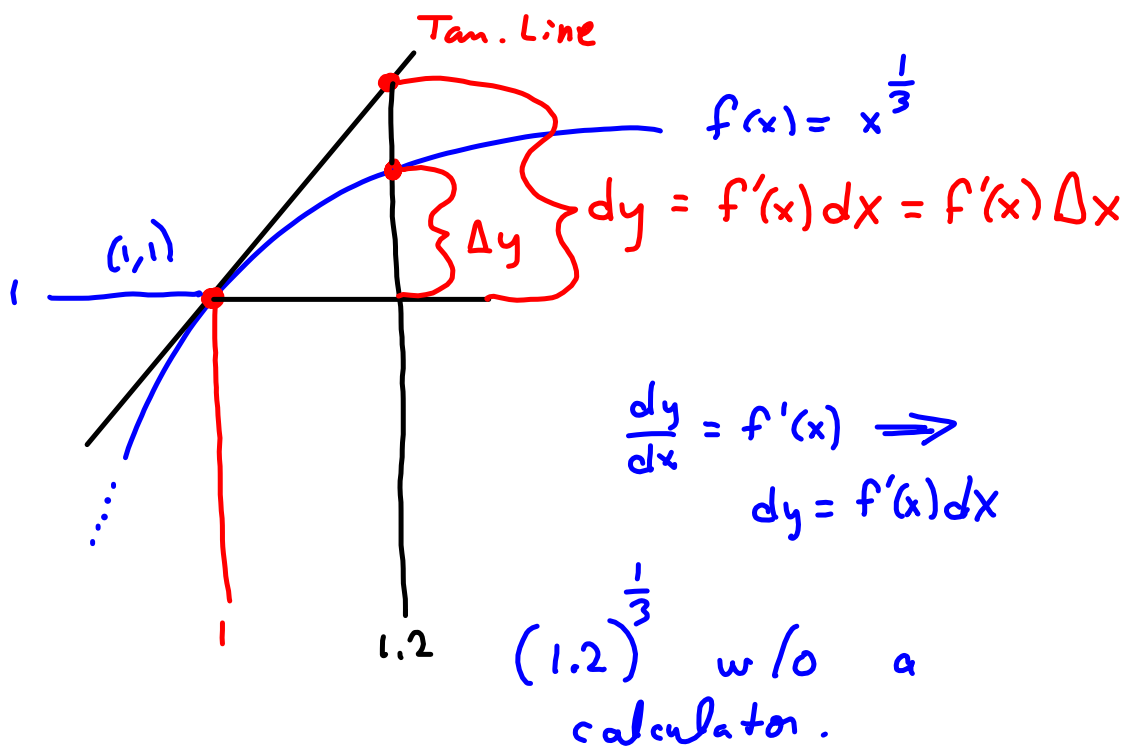
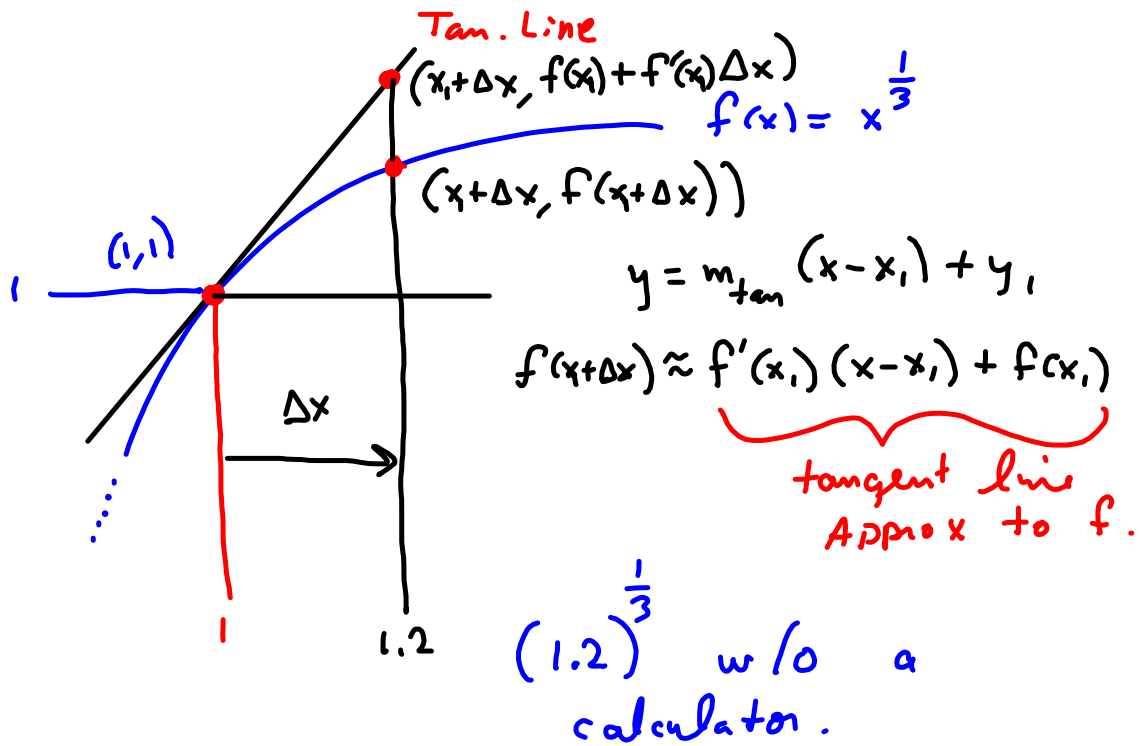


Test 1 Vid. 34 Test 1 Re-take.



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$$f(x+\Delta x) \approx f'(x_1)(x-x_1) + f(x_1)$$

$$\begin{aligned} f(x_1+\Delta x) - f(x_1) = \Delta y &\approx f'(x_1)(x_1+\Delta x - x_1) \\ &= f'(x_1)\Delta x = f'(x_1)dx = dy \end{aligned}$$

We approximate the ACTUAL change in y , Δy , with the differential of y , dy .

① Approximate $\sqrt[3]{1.2}$ w/o calculator.
Tangent line question.

② Approximate the change in $\sqrt[3]{x}$ from
 $x=1$ to $x=1.2$
Differential Question

Other differential questions:

How much paint to cover a house?

.. .. tax ball?

① want $f(1.2)$. $f(1)$ is clean, easy.

$$f(x) = \sqrt[3]{x} = x^{\frac{1}{3}} \Rightarrow$$

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

$$x_1 = 1 \quad y_1 = 1 = y,$$

$$x_2 = 1.2$$

$$f'(x_1) = \frac{1}{3} (1)^{-\frac{2}{3}} = \frac{1}{3} = m_{\text{tan}}$$

$$y = L_1(x) = m(x - x_1) + y_1$$

$$= \frac{1}{3}(x - 1) + 1$$

$$\sqrt[3]{1.2} \approx \frac{1}{3}(1.2 - 1) + 1$$

$$= \left(\frac{1}{3}\right)(.2) + 1$$

$$= (.3)(.2) + 1$$

$$= .06 + 1$$

$$= 1.06$$

$$\begin{aligned} \textcircled{2} \quad \Delta y &\approx dy = f'(x_1) dx \\ &= f'(x_1) \Delta x \\ &= \left(\frac{1}{3}\right)(.2) \\ &= .\overline{06} \end{aligned}$$

① Approximate
 $\sqrt{26}$

② Approx $\sqrt{26} - \sqrt{25}$ w/ a differential

① Want $\sqrt{26}$

$$f(x) = \sqrt{x} = x^{\frac{1}{2}} \quad x_1 = 25 \quad \sqrt{26}$$

$$f'(x) = \frac{1}{2} x^{-\frac{1}{2}} = \frac{1}{2\sqrt{x}} \quad x_2 = 26 \quad \sqrt{27}$$

$$f'(25) = \frac{1}{2\sqrt{25}} = \frac{1}{10} = m_{\text{tan}} \quad \Delta x =$$

$$f(25) = \sqrt{25} = 5 = y_1$$

$$y = m(x - x_1) + y_1$$

$$y = \frac{1}{10}(x - 25) + 5$$

$$y(26) = \frac{1}{10}(26 - 25) + 5 = 5.1$$