

2C. Max-min problems

$$1) V = (12 - 2x)^2 \cdot x \Rightarrow V' = 12^2 + 4x^2 - 48x \Rightarrow V' = 0 \Rightarrow x = 2$$

$$2) L = 2n + y, xy = A \Rightarrow L = 2n + \frac{A}{n} \Rightarrow 0 = 2 - \frac{A}{n^2} \Rightarrow n = 100$$

$$4) 4x + y = 108 \Rightarrow (x(108 - 4x))' = 216n - 12n^2 = 0 \Rightarrow n = 18$$

$$1_0) T = \frac{\sqrt{100^2 + n^2}}{5} + \frac{\sqrt{100^2 + (n-n)^2}}{2} \Rightarrow T' = 0 \Rightarrow \frac{\sin \alpha}{\sin \beta} = \frac{5}{2}$$

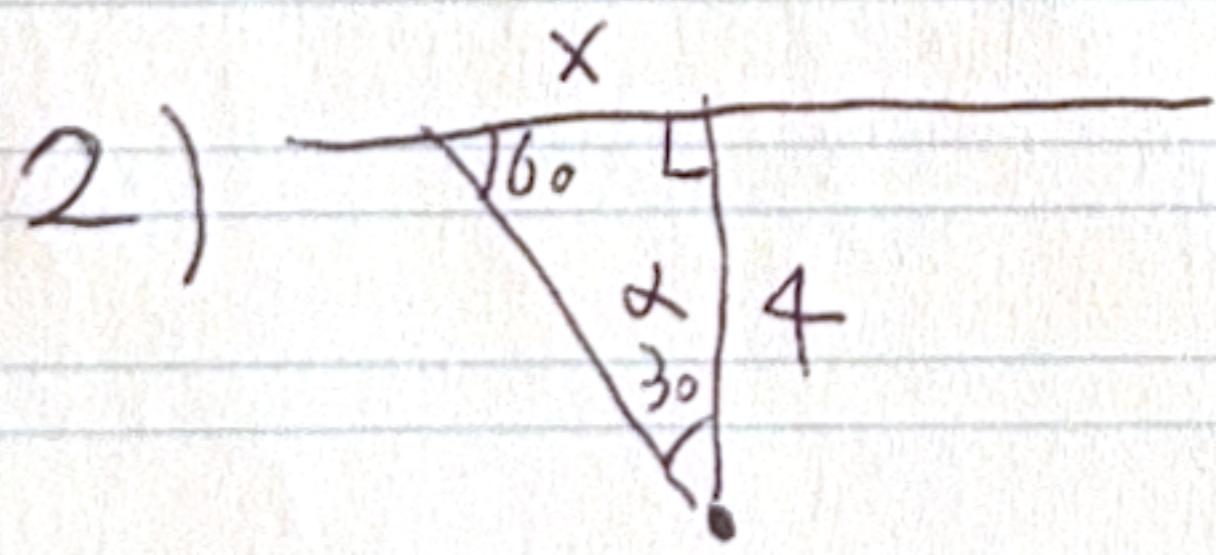
$$13a) S = 100 + \frac{(200 - P) \cdot 2}{5} \quad R = P \cdot S = P \cdot \left(100 + \left(40 - \frac{P}{5}\right) \cdot 2\right)$$

$$R' = 180 - \frac{4}{5}P = 0 \Rightarrow P = 225 \$$$

$$13b) R_+ = P \cdot \cancel{(10 - P)} \cdot 10^5 \left(10 - \frac{P}{2}\right) \left(P - 10 + \left(10 - \frac{P}{2}\right)\right)$$

$$R'_+ = 10^5 \left(10 - P\right) \Rightarrow P = 10$$

2E. Related Rates



$$\alpha' = 108^\circ$$

$$x = \tan \alpha \cdot 4 \quad 3 \cdot 108^\circ$$

$$x' = \frac{4}{\cos^2 \alpha} \alpha' = \cancel{\frac{4}{\cos^2 \alpha} \cdot 108^\circ}$$

2F. Locating zeros;

Newton's method

1a) $y < 0 \Rightarrow$ one x-intercept

$$1b) x_1 = 1 \quad x_2 = x_1 - (\cos x_n - x_n) / (\sin x_n + 1) = .750$$

-x153