4. $P = \frac{1}{6}x^3 - 5x^2 + 25x + 20$

$P' = 3 \cdot \frac{1}{6}x^2 - 5 \cdot 2x + 25$

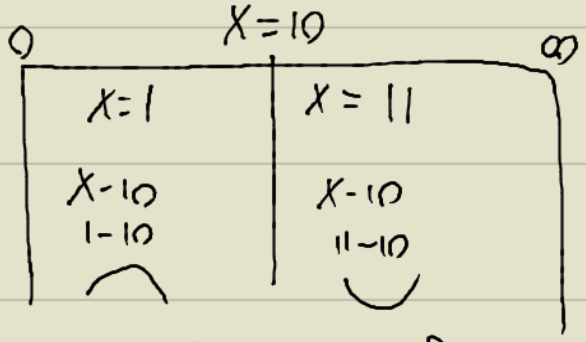
$= \frac{1}{2}x^2 - 10x + 25$

$P'' = \frac{1}{2} \cdot 2x - 10$

$= x - 10$

$x - 10 = 0$

$x = 10$



NOW PLUG $x = 10$ INTO P

$P = \frac{1}{6}(10)^3 - 5(10)^2 + 25(10) + 20$

$= -293.33$

POINT OF DIMINISHING RETURNS

$(10, -293.33)$

5. $(x_1, y_1) \quad (20, 400) \quad (x_2, y_2) \quad (30, 350)$

FIND SLOPE

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

$m = \frac{350 - 400}{30 - 20}$

$m = \frac{-50}{10}$

$m = -5$

$y = mx + b$

$400 = -5(20) + b$

$400 = -100 + b$

$400 + 100 = b$

$500 = b$

$y = -5x + 500$

$P = -5x + 500$

SO

$R = xP$

$R = x(-5x + 500)$

$R = -5x^2 + 500x$

MAXIMIZE R

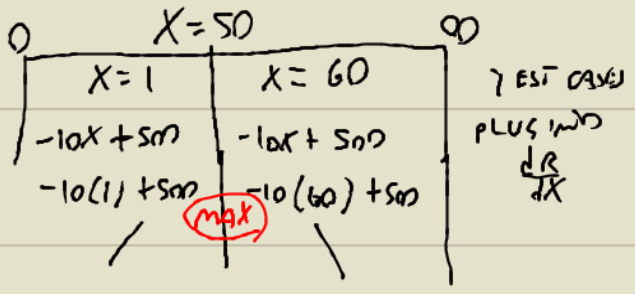
$\frac{dR}{dx} = -10x + 500$

$-10x + 500 = 0$

$500 = 10x$

$\frac{500}{10} = x$

$50 = x$



$P = -5x + 500$

$P = -5(50) + 500$

$P = -250 + 500$

$P = 250$