

4. $p = \frac{1}{6}X^3 - 5X^2 + 2X + 20$
 $p' = 3 \cdot \frac{1}{6}X^2 - 5 \cdot 2X + 2$
 $= \frac{1}{2}X^2 - 10X + 2$
 $p'' = \frac{1}{2} \cdot 2X - 10$
 $= X - 10$

$X - 10 = 0$
 $X = 10$

0	$X = 10$	∞	TEST CASES PLUS INTO p''
$X = 1$	$X = 11$		
$X - 10$ $1 - 10$ ⌒	$X - 10$ $11 - 10$ ⌒		

now plug $X = 10$ into P

$P = \frac{1}{6}(10)^3 - 5(10)^2 + 2(10) + 20$
 $= -293.33$

Point of Diminishing Return

$(10, -293.33)$

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

FIND SLOPE

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

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

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

$m = -5$

$y = mx + b$
 $400 = -5(20) + b$
 $400 = -100 + b$
 $400 + 100 = b$
 $500 = b$

$y = -5x + 500$

$P = -5x + 500$

S_0

$R = xP$

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

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

MAXIMIZE R

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

$-10x + 500 = 0$

$500 = 10x$

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

$50 = x$

0	$X = 50$	∞	TEST CASES PLUS INTO $\frac{dR}{dx}$
$X = 1$	$X = 60$		
$-10x + 500$ $-10(1) + 500$ /	$-10x + 500$ $-10(60) + 500$ / max /		

$P = -5x + 500$

$P = -5(50) + 500$

$P = -250 + 500$
 $P = 250$