Chart

$\$20 \times 80 \text{ (players)} = \$1600$

New cost

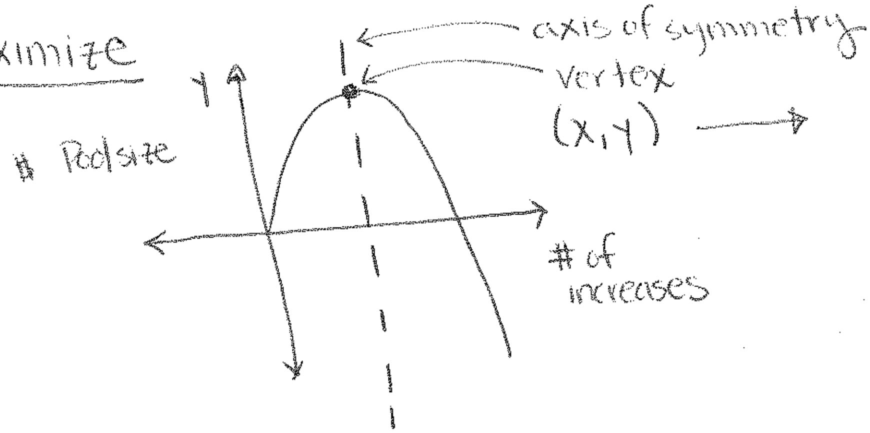
	original + increase = new		original − loss = new	#
1 more entry	$\$20 + 5(1) = \$25$	$\longrightarrow$	$80 - 5(1) = 75$	1875
2 more entries	$\$20 + 5(2) = \$30$	$\longrightarrow$	$80 - 5(2) = 70$	2100
3 more players	$\$20 + 5(3) = \$35$	$\longrightarrow$	$80 - 5(3) = 65$	2275

$$\$20 + 5(x) \longrightarrow 80 - 5(x)$$

$$P(x) = [\$20 + 5(x)] \cdot [80 - 5(x)]$$

$$P(x) = -25x^2 + 300x + 1600$$

Maximize



$\longrightarrow$ $x = -b/2a$

$x = 6$

Let's check: $[\$20 + 5(\overset{x}{6})][80 - 5(6)] = \overset{Y}{\$2500}$ (maximum)

$[20 + 5(7)][80 - 5(7)] = \$2475$

Problem 1

Original: $200 \times \$6 = \$1200$

$P(x) = [200 - 10(x)][6 + 0.50(x)] =$

$P(x) = 1200 + 100x - 60x - 5x^2$

$P(x) = -5x^2 + 40x + 1200$

Max $x = \frac{-b}{2a} = \frac{-(+40)}{2(-5)} = \frac{40}{10} = 4$ increases

a) $4 \times 0.50 = \$2$

$\$6 + \$2 = \boxed{\$8}$

(b) $P(x) = P(4) = -5(4)^2 + 40(4) + 1200$

$= -80 + 160 + 1200$

$\boxed{= \$1200} \quad \boxed{\$1280}$

Problem 2

$P(x) =$ 1400 videos x \$2.25 per video = \$3150 makes

$P(x) = [1400 - 100(x)] \times [\$2.25 + 0.25(x)]$

$= 3150 + 350x - 225(x) + {}^{-}25x^2$

$= {}^{-}25x^2 + 125x + 3150$

Max $x = \frac{-b}{2a} = \frac{-125}{2(^{-}25)} = \frac{+125}{50} = 2.50$ increases

$\$2.25 + 0.25(2.5) =$

$\$2.25 + 0.625 = \$2.875 \approx \$2.88$