

$$5. p = 4 - 0.002x$$

$$C = 40 + 2.3x$$

$$a) R = xp$$

$$R = x(4 - 0.002x)$$

$$R = 4x - 0.002x^2$$

$$b) P = R - C$$

$$P = 4x - 0.002x^2 - (40 + 2.3x)$$

$$= 4x - 0.002x^2 - 40 - 2.3x$$

$$P = -0.002x^2 + 1.7x - 40$$

$$\frac{dR}{dx} = 4 - 0.002(2)x^1$$

$$= 4 - 0.004x$$

$$\frac{dP}{dx} = -0.002(2)x^1 + 1.7$$

$$= -0.004x + 1.7$$

6.  $(x, y) = (\text{NUMBER OF TICKETS SOLD}, \text{PRICE})$

$(40000, 5)$        $(30000, 6)$   
 $x_1, y_1$        $x_2, y_2$   
 WANT DEMAND FUNCTION  
 $p = mx + b$

$$m = \frac{6-5}{30000-40000} \left( \frac{y_2 - y_1}{x_2 - x_1} \right)$$

$$m = \frac{1}{-10000}$$

$$y = mx + b$$

$$6 = \frac{-1}{10000}(30000) + b$$

$$6 = -3 + b$$

$$6 + 3 = b$$

$$9 = b$$

$$p = \frac{-1}{10000}x + 9$$

$$C = 0.15x + 90000$$

now  $R = xp = x \left( \frac{-1}{10000}x + 9 \right) = \frac{-1}{10000}x^2 + 9x$

$$P = R - C = \frac{-1}{10000}x^2 + 9x - (0.15x + 90000)$$

$$= \frac{-1}{10000}x^2 + 9x - 0.15x - 90000 = \frac{-1}{10000}x^2 + 8.85x - 90000$$

$P(x)$

$$b) \frac{dP}{dx} = \frac{-2}{10000}x + 8.85 = \frac{-1}{5000}x + 8.85$$

$$\frac{x=10000}{\frac{-1}{5000}(10000) + 8.85}$$

$$= -2 + 8.85$$

$$= 6.85$$

$$\frac{x=30000}{\frac{-1}{5000}(30000) + 8.85}$$

$$= -6 + 8.85$$

$$= 2.85$$