#8. a) $y = 1x^2 + \frac{3}{2}x - 7$

$x = \frac{-b}{2a}$

$= \frac{-3/2}{2(1)}$

$= -\frac{3}{2} \times \frac{1}{2}$

$\boxed{x_v = -\frac{3}{4}}$

$y_v = \left(-\frac{3}{4}\right)^2 + \frac{3}{2}\left(\frac{3}{4}\right) - 7$

$= \frac{9}{16} + \frac{9^{\times 2}}{8_{\times 2}} - \frac{7^{\times 16}}{1_{\times 16}}$

$= \frac{9}{16} + \frac{18}{16} - \frac{112}{16}$

$= \frac{-85}{16}$

$\therefore a = 1,\ p = -\frac{3}{4},\ q = -\frac{85}{16}$

$\Rightarrow y = \left(x - \left(-\frac{3}{4}\right)\right)^2 - \frac{85}{16}$

$\boxed{y = \left(x + \frac{3}{4}\right)^2 - \frac{85}{16}}$

#19. let x = # of 10\$ increases

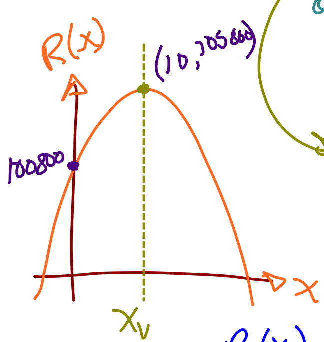
$R(x) = (360 + 10x)(280 - 5x)$

original price

\$10 increases

original # sold

5 less per \$10 increase



put R(x) into vertex form ... but must first put into general form.

$R(x) = 100800 - 1800x + 2800x - 50x^2$

(general) $R(x) = -50x^2 + 1000x + 100800$

now get the vertex

$x_v = \frac{-b}{2a}$

$= \frac{-1000}{2(-50)}$

$\boxed{x_v = 10}$

R(x) for max revenue is

$R(10) = (360 + 10(10))(280 - 5(10))$

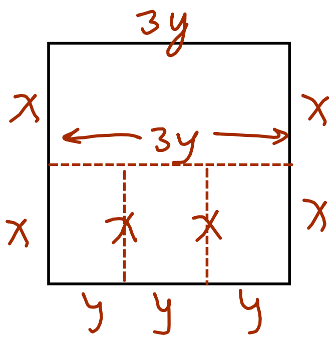
$= (460)(230)$

new price

new # sold

$\boxed{R_{max} = 105800}$

#22.



fencing = 900 m

$900 = 6x + 9y$

$\boxed{150 = x + \frac{3}{2}y}$ ①

$\left(150 - x = \frac{3}{2}y\right) \times 2$

$\frac{300}{3} - \frac{2x}{3} = \frac{3y}{3}$

$\boxed{100 - \frac{2}{3}x} = y$ sub ① into ②

$A = L \times W$

② $A = (2x)(3y)$

$A(x) = 2x\left[3\left(100 - \frac{2}{3}x\right)\right]$

$A(x) = 2x(300 - 2x)$

$A(x) = 600x - 4x^2$

$\boxed{A(x) = (-4x^2 + 600x)} + 0$

now get $x_v = \frac{-b}{2a}$

$= \frac{-600}{2(-4)}$

$x_v = 75$

$A(x_v) = -4(75)^2 + 600(75)$

$= -22500 + 45000$

$A(x_v) = 22500$

∴ max area is 22500 when $\boxed{x = 75}$

and since $y = 100 - \frac{2}{3}x$

$y = 100 - \frac{2}{3}(75)$

$\boxed{y = 50}$ m

Review pg. 198 #1-17.