

Example 2:

$$y = 3x^2 - 7x + 11 \leftarrow \text{quad. relation.}$$

To optimize we complete the square
(get it into vertex form)

$$y = 3\left(x^2 - \frac{7}{3}x\right) + 11$$

$$y = 3\left(x^2 - \frac{7}{3}x + \frac{49}{36} - \frac{49}{36}\right) + 11$$

$$y = 3\left(x^2 - \frac{7}{3}x + \frac{49}{36}\right) - \frac{49}{12} + 11$$

$$y = 3\left(x - \frac{7}{6}\right)^2 - \frac{49}{12} + \frac{132}{12}$$

$$y = 3\left(x - \frac{7}{6}\right)^2 + \frac{83}{12} \rightarrow y_v = \text{optimum } y\text{-value}$$

The min value of y $\frac{83}{12}$ when $x = \frac{7}{6}$