Derivatives as a Rate Measurer Ex 13.1 Q8

Marginal cost is the rate of change of total cost with respect to output.

$$\therefore \text{Marginal cost (MC)} = \frac{dC}{dx} = 0.007\left(3x^2\right) - 0.003\left(2x\right) + 15$$

$$= 0.021x^2 - 0.006x + 15$$

When $x = 17$, $MC = 0.021\ (17^2) - 0.006\ (17) + 15$

$$= 0.021(289) - 0.006(17) + 15$$

$$= 6.069 - 0.102 + 15$$

$$= 20.967$$

Hence, when 17 units are produced, the marginal cost is Rs. 20.967

Derivatives as a Rate Measurer Ex 13.1 Q9

Marginal revenue is the rate of change of total revenue with respect to the number of units sold.

$$\therefore \text{Marginal Revenue (MR)} = \frac{dR}{dx} = 13(2x) + 26 = 26x + 26$$

When $x = 7$,

$$MR = 26(7) + 26 = 182 + 26 = 208$$

Hence, the required marginal revenue is Rs 208.

Derivatives as a Rate Measurer Ex 13.1 Q10

$$R(x) = 3x^2 + 36x + 5$$

$$\frac{dR}{dx} = 6x + 36$$

$$\left.\frac{dR}{dx}\right|_{x=5} = 6 \times 5 + 36$$

$$= 30 + 36$$

$$= 66$$

This, as per the question, indicates the money to be spent on the welfare of the employess, when the number of employees is 5.

*********** END **********