

14] Suppose the production function for a product is

$$Z = 60 X^{\frac{2}{5}} Y^{\frac{3}{5}}$$

where X is the capital expenditures and Y is the number of work hours. Find the marginal productivity of

a) X

$$\begin{aligned} \rightarrow \frac{\partial Z}{\partial X} &= 60 \left(\frac{2}{5} \right) X^{-\frac{3}{5}} Y^{\frac{3}{5}} \\ &= 24 X^{-\frac{3}{5}} Y^{\frac{3}{5}} \end{aligned}$$

b) Y

$$\begin{aligned} \frac{\partial Z}{\partial Y} &= 60 \left(\frac{3}{5} \right) X^{\frac{2}{5}} Y^{-\frac{2}{5}} \\ &= 36 X^{\frac{2}{5}} Y^{-\frac{2}{5}} \end{aligned}$$

16] Suppose that a company's production for a product

$$Z = (X+1)^{\frac{1}{2}} \ln(Y^2+1)$$

Find the marginal productivity of

a) X .

$$\frac{\partial Z}{\partial X} = \frac{1}{2} (X+1)^{-\frac{1}{2}} \ln(Y^2+1) = \frac{\ln(Y^2+1)}{2\sqrt{X+1}}$$