

Exercise 2.7

Question

2.7. Production Function IV
As 2.4 (a), for: $Z = 0.3X^{0.8}Y^{0.6}$

Solution from Manual

2.7 Production Function IV

$$MP_X = (0.8/X) Z \qquad MP_Y = (0.6/Y) Z$$

$$MRS = - 4Y / 3X$$

$$RTS : \Sigma a_i = 1.4 > 1 \qquad \text{Strong RTS}$$

Additional Notes

$$MP_x = \frac{\partial Z}{\partial X} = 0.8 \cdot 0.3 \cdot X^{-0.2} Y^{0.6} = 0.24 X^{-0.2} Y^{0.6}$$

$$MP_y = \frac{\partial Z}{\partial Y} = 0.6 \cdot 0.3 \cdot X^{0.8} Y^{-0.4} = 0.18 X^{0.8} Y^{-0.4}$$

$$MRS = \frac{\Delta Y}{\Delta X} = - \frac{MP_x}{MP_y} = - \frac{0.24 X^{-0.2} Y^{0.6}}{0.18 X^{0.8} Y^{-0.4}} = - \frac{4Y}{3X}$$

$\Sigma a_i = 0.8 + 0.6 = 1.4$ so we have increasing RTS.