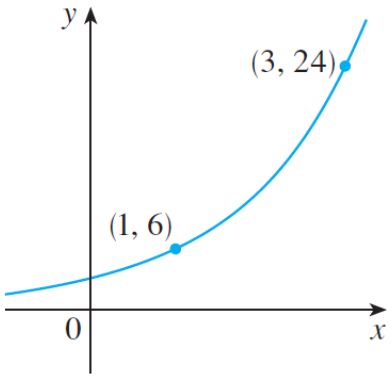
Exercise 21

Find the exponential function $f(x) = Cb^x$ whose graph is given.



Solution

Since two points are given on the curve and there are two unknowns, C and b can be determined.

$$f(1) = Cb^1 = 6 \tag{1}$$
$$f(3) = Cb^3 = 24 \tag{2}$$

Solve equation (1) for C

$$C = \frac{6}{b} \tag{3}$$

and substitute it into equation (2).

$$\left(\frac{6}{b}\right) b^3 = 24$$

Solve for b.

$$6b^2 = 24$$
$$b^2 = 4$$
$$b = \pm 2$$

Since the base has to be positive, choose $b = 2$. From equation (3) then,

$$C = \frac{6}{2} = 3.$$

Therefore,

$$f(x) = 3 \cdot 2^x.$$