

Dr Oliver Mathematics

Proportion: Part 1

1. When $t = 2$, $N = 300$.

Gail thinks that N is directly proportional to the square of t .
She finds a formula for N in terms of t .

- (a) Work out the value of N when $t = 4$ using Gail's formula. (4)

Solution

$$N \propto t^2 \Rightarrow N = kt^2$$

for some constant k . Now,

$$300 = k \cdot 2^2 \Rightarrow k = 75$$

and

$$N = 75t^2.$$

Finally,

$$N = 75 \cdot 4^2 = \underline{\underline{1\,200}}.$$

Megan thinks that Gail is wrong.
She thinks that the formula

$$N = 75 \times 2^t$$

should be used.

When $t = 6$, $N = 4\,800$.

- (b) Showing your working clearly, find out which formula fits these values. (2)

Solution

Gail:

$$N = 75 \cdot 6^2 = 2\,700.$$

Megan:

$$N = 75 \cdot 2^6 = 4\,800.$$

So, Megan is right.