Multipliers

Examples

1) To add on 7% the multiplier is 1.07

2) To subtract 6% the multiplier is 0.94

3) If bacteria increase by 115% per hour then the hourly multiplier would be 2.15

3) If a population of 2,500,000 is growing at 3.4% then the predicted population 4 years later would be $2,500,000 \times 1.034^4$

$$= 2,857,736$$

or 2,860,000 to 3 s.f.

The multiplier here is 1.034

Finding Multipliers

Suppose £1000 is invested for 3 years and returns £1170.91

Find the A.P.R. (annual percentage rate)

$$1000 \times M^3 = 1170.91$$

$$M^3 = \frac{1170.91}{1000}$$

$$M = \sqrt[3]{\frac{1170.91}{1000}} = 1.054001361$$

$$M = 1.054$$

Interest Rate 5.4% per annum

123,000 positive PCR tests are recorded on 20 Dec. 214,000 are recorded on 25 Dec what is the daily growth rate as a percentage

$$123,000 \times M^5 = 214,000$$

$$M^5 = \frac{214,000}{123,000}$$

$$M = \sqrt[5]{\frac{214000}{123,000}} = 1.117$$

Daily growth rate = 11.7%

Find doubling time

trial and improvement

$$1.117^6 = 1.94$$

$$1.117^7 = 2.17$$

Doubling time between 6 and 7 days

Exercise 22.55

2)   800 trout in lake   Decreases by 15% each year
                                          Multiplier 0.85

              After   1 year   680
                       2 years   578
                       3 years   491
                       4 years   418
                       5 years   355
                       6 years   302

                       7 years   256
                       8 years   218

        After   n   years   the number of
        trout will be
                    800×0.85^{n}