

Reverse of compound Interest or Depreciation

Ex1

Suppose £2000 invested for 5 years amounts to £2433.31. What was the 'interest rate per annum?

$$2000 \times M^5 = 2433.31$$

$$M^5 = \frac{2433.31}{2000}$$

$$M = \sqrt[5]{\frac{2433.31}{2000}}$$

$$x^{\frac{1}{n}} = \sqrt[n]{x}$$

$$M = \left(\frac{2433.31}{2000} \right)^{\frac{1}{5}}$$

$$M = 1.040000359$$

Annual rate of interest = 4%

Ex2 £4350 amounts to £6627.67 in 7 years. Find annual rate of interest

$$4350 \times M^7 = 6627.67$$

$$M^7 = \frac{6627.67}{4350}$$

$$M = \sqrt[7]{\frac{6627.67}{4350}}$$

$$M = \left(\frac{6627.67}{4350} \right)^{\frac{1}{7}}$$

$$M = 1.062000001$$

Annual rate of interest = 6.2 %

Ex3 £2500 amounts to £2782.45 in 6 years. Find annual interest rate

$$2500 \times M^6 = 2782.45$$

$$M^6 = \frac{2782.45}{2500}$$

$$M = \sqrt[6]{\frac{2782.45}{2500}}$$

$$M = \left(\frac{2782.45}{2500} \right)^{\frac{1}{6}}$$

$$M = 1.01800027$$

Annual rate of interest = 1.8 %

Depreciation

Ex4 A car costing £10000 new depreciates to £4182 in 5 years. What is the annual rate

of depreciation.

$$10000 \times M^5 = 4182$$

$$M^5 = \frac{4182}{10000}$$

$$M = \sqrt[5]{\frac{4182}{10000}}$$

$$M = \left(\frac{4182}{10000} \right)^{\frac{1}{5}}$$

$$M = 0.8399952026$$

$$M \approx 0.84$$

so Annual Depreciation Rate = 16%

Ex5 A car costing £36,000 new is valued at £20000 after 4 years. What percentage annual depreciation is that to 1 dec place

$$36000 \times M^4 = 20000$$

$$M^4 = \frac{20000}{36000}$$

$$M = \left(\frac{20000}{36000} \right)^{\frac{1}{4}}$$

$$M = 0.8633400214$$

$$M \approx 0.863$$

Depreciation rate 13.7 % per annum

Ex 6 In 1996 a bungalow cost £63,000
In 2020 it is worth £235,000. What is
the annual rate of house price inflation.

$$2020 - 1996 = 24 \text{ years}$$

$$63000 \times M^{24} = 235000$$

$$M^{24} = \frac{235000}{63000}$$

$$M = \left(\frac{235000}{63000} \right)^{\frac{1}{24}}$$

$$M = 1.056384381$$

House price inflation = 5.6 % per annum

Ex 7 At 4 pm there are approximately
14000 bacteria present in a culture
At 5 pm there are approximately
18000 present. What is the percentage
growth rate per minute.

$$1 \text{ hour} = 60 \text{ min}$$

