



# Annual depreciation and inflation

Student name: \_\_\_\_\_ Score: \_\_\_\_\_

1. Rachel purchases a new car.

The car's value in dollars,  $V$ , is modelled by the function

$$V(t) = 18240 - k(1.15)^t, t \geq 0$$

where  $t$  is the number of years since the car was purchased and  $k$  is a constant.

- (a) Write down, and simplify, an expression for the car's value when Rachel purchased it.

After three years, the car's value is \$13 616.55

- (b) Find the value of  $k$ .

This model is defined for  $0 \leq t \leq n$ . At  $n$  years the car's value will be zero dollars.

Find the value of  $n$ .

2. In 2000 Herman joined a tennis club. The fees were £ 1200 a year. Each year the fees increase by 3 %.

- (a) Calculate, **to the nearest £ 1**, the fees in 2002.

- (b) Calculate the **total** fees for Herman who joined the tennis club in 2000 and remained a member for five years.

3. The value of a car decreases each year. This value can be calculated using the function

$$v = 32\,000r^t, t \geq 0, 0 < r < 1,$$

where  $v$  is the value of the car in USD,  $t$  is the number of years after it was first bought and  $r$  is a constant.

- (a) (i) Write down the value of the car when it was first bought.

- (ii) One year later the value of the car was 27 200 USD. Find the value of  $r$ .

- (b) Find how many years it will take for the value of the car to be less than 8000 USD.

4. Kylie bought a car for 1200 AUD which depreciated at a rate of  $r$  % per year. The value of the car after 7 years is 669 AUD.

Find the rate of depreciation.

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5. The rate of inflation from the beginning of 1995 has been 4.5% per year.
- (a) A loaf of bread cost \$1.70 on January 1, 1996. What did it cost on January 1, 1999?
  - (b) A car cost \$40 000 on January 1, 1999. What did it cost on January 1, 1997? (Give your answer to the nearest thousand dollars.)
6. Mario has spent \$ 40000 to buy some land. The land increases in value by 5 % each year.
- (a) What is the value of the land after the end of five years?
- At the end of five years, Mario sells the land. He pays 1 % tax on the sale and spends the rest of the money on a car. The car loses value at a rate of \$ 2500 every year.
- (b) How much tax does Mario pay?
  - (c) How much is the car worth five years after Mario buys it?
7. Devra then bought a computer that cost 1100 USD and sold it 4 years later for 350 USD.
- Find the rate at which the computer depreciated per year.

