



Annual depreciation and inflation

Student name: _____ Score: _____

1. Gabriella purchases a new car.

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

$$V(t) = 12870 - k(1.1)^t, t \geq 0$$

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 Gabriella purchased it. [2]

After two years, the car's value is \$9143.20.

- (b) Find the value of k . [2]

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

- (c) Find the value of n . [2]

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 27200 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. [3]



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.
- (i) 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.
- (ii) How much tax does Mario pay?
 - (iii) How much is the car worth five years after Mario buys it?





Annual depreciation and inflation

Student name: _____ **ANSWERS** _____ Score: _____

1. Gabriella purchases a new car.

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

$$V(t) = 12870 - k(1.1)^t, t \geq 0$$

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 Gabriella purchased it. [2]

$$12\,870 - k$$

After two years, the car's value is \$9143.20.

- (b) Find the value of k . [2]

$$3080$$

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

- (c) Find the value of n . [2]

$$15$$

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. 1273

- (b) Calculate the **total** fees for Herman who joined the tennis club in 2000 and remained a member for five years. 6370.96

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. 32 000
 (ii) One year later the value of the car was 27200 USD. Find the value of r . 0.85

- (b) Find how many years it will take for the value of the car to be less than 8000 USD. 8.53 (9)

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. [3]

$$8.01\%$$



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?

\$1.94

(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.)

37 000

6. Mario has spent \$ 40 000 to buy some land. The land increases in value by 5 % each year.

(i) What is the value of the land after the end of five years? 51 051.26

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.

(ii) How much tax does Mario pay? 510.51

(iii) How much is the car worth five years after Mario buys it? 38 040.75

