

1 (a)* On average, human hair grows $1\frac{1}{4}$ cm each month.

Lizzie wants her hair to be at least 18 cm longer than it is now.

How many months is it likely that she will have to wait?

(a) months [3]

(b) You are given that t is a positive number.

(i) Write down the reciprocal of t .

(b)(i) [1]

(ii) What is the value of the following?

t multiplied by the reciprocal of t .

(ii) [1]

- 2 (a) The mass of the Earth is approximately 10^{21} tonnes.
There are 1000 kilograms in one tonne.

What is the mass of the Earth in kilograms?
Give your answer using indices.

(a) _____ kg [2]

- (b) The mass of the planet Mercury is 10^{23} kg.
The mass of the planet Jupiter is 10^{27} kg.

Complete this sentence.

The mass of Jupiter is _____ times the mass of Mercury. [2]

- (c) Work out.

$$100^{-\frac{1}{2}}$$

(c) _____ [3]

- 3 (a) The voltage in an electric circuit is calculated using this formula.

$$\text{Voltage in volts} = \text{Current in amps} \times \text{Resistance in ohms}$$

Calculate the voltage when the resistance is 6.5 ohms and the current is 3.6 amps.
Give your answer correct to **two** significant figures.

(a) _____ volts [4]

- (b) The resistance in an electric circuit is calculated using this formula.

$$\text{Resistance in ohms} = \frac{\text{Voltage in volts}}{\text{Current in amps}}$$

Calculate the resistance when the voltage is 10^{12} volts and the current is 10^3 amps.

(b) _____ ohms [1]

- 4 The population of a small village is given by this formula.

$$P = 850 \times 0.8^t$$

P is the population of the village and t is the number of years after the year 2009.

- (a) What was the population of the village in the year 2009?

(a) _____ [1]

- (b) What is the expected population of the village in 2013?

(b) _____ [2]