# 1.1 using standard form

**1a.** *[2 marks]*

A calculator fits into a cuboid case with height 29 mm, width 98 mm and length 186 mm.

Find the volume, in mm, of this calculator case. Give your answer to two significant figures.

**1b.** *[2 marks]*

Write down your answer to part (a) in the form  where 1 ≤  < 10 and .

**1c.** *[2 marks]*

Find the volume, in cm, of this calculator case.

**2a.** *[3 marks]*

A sphere with diameter 3 474 000 metres can model the shape of the Moon.

Use this model to calculate the circumference of the Moon in **kilometres**. Give your full calculator display.

**2b.** *[1 mark]*

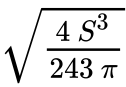
Give your answer to part (a) correct to three significant figures.

**2c.** *[2 marks]*

Write your answer to **part (b)** in the form , where 1 ≤  < 10 , .

**3a.** *[3 marks]*

The volume of a hemisphere, *V*, is given by the formula

*V* = ,

where *S* is the total surface area.

The total surface area of a given hemisphere is 350 cm.

Calculate the volume of this hemisphere in cm.

Give your answer correct to **one decimal place**.

**3b.** *[1 mark]*

Write down your answer to part (a) correct to the nearest integer.

**3c.** *[2 marks]*

Write down your answer to **part (b)** in the form *a* × 10 , where 1 ≤ *a* < 10 and *k*∈.

**4a.** *[2 marks]*

Each year the soccer team, Peterson United, plays 25 games at their home stadium. The owner of Peterson United claimed that last year the mean attendance per game at their home stadium was 24500.

Based on the owner’s claim, calculate the total attendance for the games at Peterson United’s home stadium last year.

**4b.** *[2 marks]*

The actual total attendance last year was 617700.

Calculate the percentage error in the owner’s claim.



**4c.** *[2 marks]*

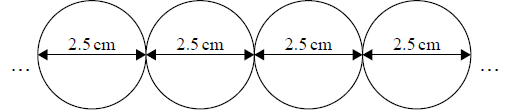
Write down your answer to **part (b)** in the form *a* × 10 where 1 ≤ a < 10, .



**5a.** *[3 marks]*

Last year a South American candy factory sold 4.8 × 10 spherical sweets. Each sweet has a diameter of 2.5 cm.

The factory is producing an advertisement showing all of these sweets placed in a straight line.



Find the length, in cm, of this line. Give your answer in the form *a* × 10 , where 1 ≤ *a* < 10 and k ∈ .



**5b.** *[1 mark]*

The advertisement claims that the length of this line is *x* times the length of the Amazon River. The length of the Amazon River is 6400 km.

Write down the length of the Amazon River in cm.

**5c.** *[2 marks]*

Find the value of *x*.

**6a.** *[3 marks]*

The speed of light is  kilometres per second. The average distance from the Sun to the Earth is 149.6 million km.

Calculate the time, **in minutes**, it takes for light from the Sun to reach the Earth.

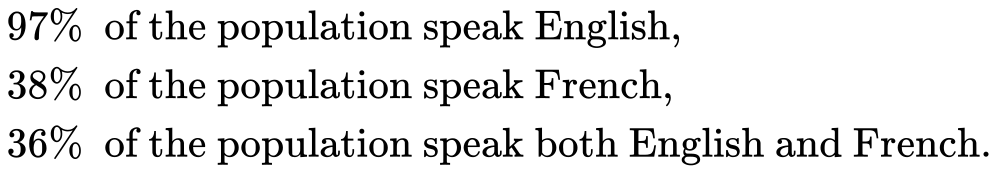
**6b.** *[3 marks]*

A light-year is the distance light travels in one year and is equal to  million km. Polaris is a bright star, visible from the Northern Hemisphere. The distance from the Earth to Polaris is 323 light-years.

Find the distance from the Earth to Polaris in millions of km. Give your answer in the form  with  and .

**7a.** *[2 marks]*

In the Canadian city of Ottawa:



Calculate the percentage of the population of Ottawa that speak English but not French.

**7b.** *[2 marks]*

The total population of Ottawa is .

Calculate the number of people in Ottawa that speak both English and French.



**7c.** *[2 marks]*

Write down your answer to part (b) in the form  where  and *k*.



**8a.** *[2 marks]*

Consider the numbers  and .

Calculate . Give your full calculator display.



**8b.** *[1 mark]*

Write down your answer to part (a) correct to two decimal places;

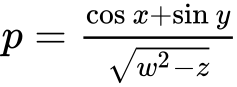
**8c.** *[1 mark]*

Write down your answer to part (a) correct to three significant figures.

**8d.** *[2 marks]*

Write your answer to **part (b)(ii)** in the form , where .

**9a.** *[2 marks]*

Let ,

where  and .

Calculate the value of . Write down your full calculator display.

**9b.** *[2 marks]*

Write your answer to part (a)

(i)     correct to two decimal places;

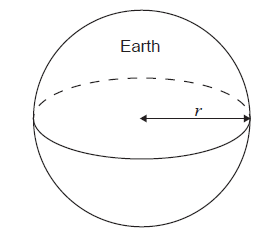
(ii)     correct to three significant figures.

**9c.** *[2 marks]*

Write your answer to **part (b)(ii)** in the form , where .

**10a.** *[4 marks]*

Assume that the Earth is a sphere with a radius,  , of  .



i)     Calculate the surface area of the Earth in .

ii)    Write down your answer to part (a)(i) in the form  , where  and  .

**10b.** *[2 marks]*

The surface area of the Earth that is covered by water is approximately  .

Calculate the percentage of the surface area of the Earth that is covered by water.

**11a.** *[3 marks]*

Assume the Earth is a perfect sphere with radius 6371 km.

Calculate the volume of the Earth in . Give your answer in the form , where  and .



**11b.** *[3 marks]*

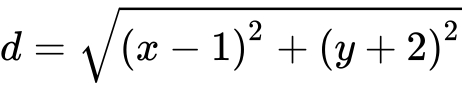
The volume of the Moon is .

Calculate how many times greater in volume the Earth is compared to the Moon.

Give your answer correct to the nearest **integer**.



**12a.** *[3 marks]*

The distance  from a point  to the point  is given by 

Find the distance from  to . Give your answer correct to two decimal places.

**12b.** *[1 mark]*

Write down your answer to **part (a)** correct to three significant figures.

**12c.** *[2 marks]*

Write down your answer to **part (b)** in the form , where  and .

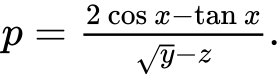
**13.** *[2 marks]*

Mandzur, a farmer, takes out a loan to buy a buffalo. He borrows 900 000 Cambodian riels (KHR) for 2 years. The nominal annual interest rate is 15%, compounded **monthly**.

Write down your answer to part (a) in the form .



**14.** *[4 marks]*

Let 

Write down your answer to part (a)

(i)     correct to two decimal places;

(ii)     correct to four significant figures;

(iii)     in the form , where .

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