1. Given $p = x - \frac{\sqrt{y}}{z}$, $x = 1.775$, $y = 1.44$ and $z = 48$,

(a) calculate the value of p.

(2)

Barry **first** writes x, y and z correct to one significant figure and **then** uses these values to estimate the value of p.

(b) (i) Write down x, y and z each correct to one significant figure.

(ii) Write down Barry's estimate of the value of p.

(2)

(c) Calculate the percentage error in Barry's estimate of the value of p.

(2)

(Total 6 marks)

2. A satellite travels around the Earth in a circular orbit 500 kilometres above the Earth's surface. The radius of the Earth is taken as 6400 kilometres.

(a) Write down the radius of the satellite's orbit.

(1)

(b) Calculate the distance travelled by the satellite in one orbit of the Earth. Give your answer correct to the nearest km.

(3)

(c) Write down your answer to (b) in the form $a \times 10^k$, where $1 \leq a < 10$, $k \in \mathbb{Z}$.

(2)

(Total 6 marks)

3. The planet Earth takes one year to revolve around the Sun. Assume that a year is 365 days and the path of the Earth around the Sun is the circumference of a circle of radius 150 000 000 km.

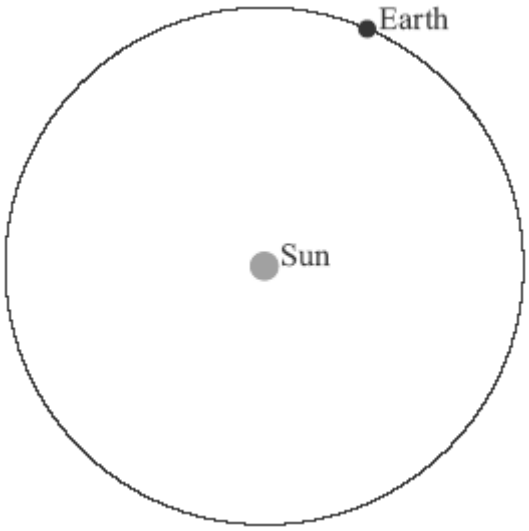

diagram not to scale

(a) Calculate the distance travelled by the Earth in **one day**.

(4)

(b) Give your answer to part (a) in the form $a \times 10^k$ where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(2)

(Total 6 marks)

4. The volume of a sphere is $V = \sqrt{\frac{S^3}{36\pi}}$, where S is its surface area.

The surface area of a sphere is 500 cm^2.

(a) Calculate the volume of the sphere. Give your answer correct to **two decimal places**.

(3)

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

(1)

(c) Write down your answer to (b) in the form $a \times 10^n$, where $1 \leq a < 10$ and $n \in \mathbb{Z}$.

(2)

(Total 6 marks)

5. Consider the following four numbers.

$$p = 0.00314 \; ; \; q = 0.00314 \times 10^2 \; ; \; r = \frac{\pi}{1000} \; ; \; s = 3.14 \times 10^{-2}$$

(a) One of these numbers is written in the form $a \times 10^k$ where $1 \leq a < 10$ and $k \in \mathbb{Z}$. Write down this number.

(1)

(b) Write down the smallest of these numbers.

(2)

(c) Write down the value of $q + s$.

(1)

(d) Give your answer to part (c) in the form $a \times 10^k$ where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(2)

(Total 6 marks)

6. (a) Calculate exactly $\frac{(3\times 2.1)^3}{7\times 1.2}$.

(1)

(b) Write the answer to part (a) correct to 2 significant figures.

(1)

(c) Calculate the percentage error when the answer to part (a) is written correct to 2 significant figures.

(2)

(d) Write your answer to **part (c)** in the form $a \times 10^k$ where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(2)

(Total 6 marks)

7. Given that $h = \sqrt{l^2 - \frac{d^2}{4}}$,

(a) Calculate the **exact** value of h when $l = 0.03625$ and $d = 0.05$.

(2)

(b) Write down the answer to part (a) correct to three decimal places.

(1)

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

(1)

(d) Write down the answer to part (a) in the form $a \times 10^k$, where $1 \leq a < 10$, $k \in \mathbb{Z}$.

(2)

(Total 6 marks)

8. (a) Calculate $\frac{77.2 \times 3^3}{3.60 \times 2^2}$.

(1)

(b) Express your answer to part (a) in the form $a \times 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(2)

(c) Juan estimates the length of a carpet to be 12 metres and the width to be 8 metres. He then estimates the area of the carpet.

(i) Write down his estimated area of the carpet.

(1)

When the carpet is accurately measured it is found to have an area of 90 square metres.

(ii) Calculate the percentage error made by Juan.

(2)

(Total 6 marks)

9. Let $x = 7.94$.

(a) Calculate the value of $\frac{2x+1}{x^3}$.

(b) (i) Give your answer correct to **three** decimal places.

(ii) Write your answer to (b)(i) as a percentage.

(c) Give your answer to part (b)(i) in the form $a \times 10^k$, where $1 \leq a < 10$, $k \in \mathbb{Z}$.

(Total 6 marks)

10. A field is 91.4 m long and 68.5 m wide.

(a) Calculate the area of the field in m^2.

(b) Calculate the area of the field in cm^2.

(c) Express your answer to (b) in the form $a \times 10^k$ where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(Total 6 marks)