1. 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)

2. 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.
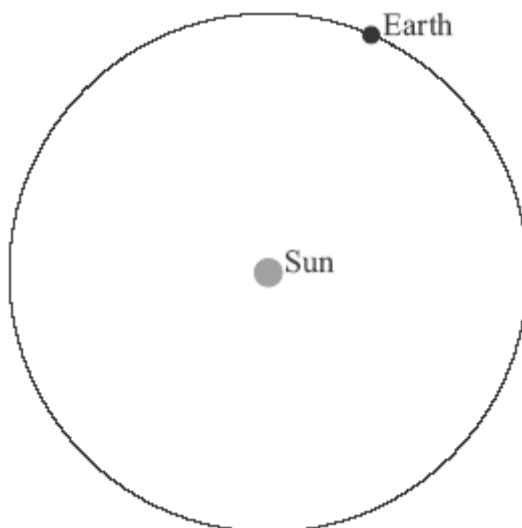

diagram not to scale

    (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)

3. A rectangle is 2680 cm long and 1970 cm wide.

    (a) Find the perimeter of the rectangle, giving your answer in the form $a \times 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

                                                                       (3)

    (b) Find the area of the rectangle, giving your answer correct to the nearest thousand square centimetres.

                                                                    (Total 6 marks)

4. Let $x = 7.94$.

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

    (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)

5. 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)

6. (a) Given $x = 2.6 \times 10^4$ and $y = 5.0 \times 10^{-8}$, calculate the value of $w = x \times y$. Give your answer in the form $a \times 10^k$ where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(b) Which **two** of the following statements about the nature of x, y and w above are **incorrect**?

(i) $x \in \mathbb{N}$

(ii) $y \in \mathbb{Z}$

(iii) $y \in \mathbb{Q}$

(iv) $w < y$

(v) $x + y \in \mathbb{R}$

(vi) $\dfrac{1}{w} < x$

(Total 8 marks)

7. The total weight of 256 identical pencils is 4.24 kg. Calculate the weight of one pencil, in kg.

(a) Give your answer exactly.

(b) Give your answer correct to three significant figures.

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

(Total 8 marks)

8. Let $x = 6.4 \times 10^7$ and $y = 1.6 \times 10^8$.

Find

(a) $\dfrac{x}{y}$

(b) $y - 2x$,

giving your answers in the form $a \times 10^k$ where $1 \le a < 10$ and $k \in \mathbb{Z}$.

(Total 8 marks)

9. Using the formula $V = \pi r^2 (H - h)$, and your calculator value of π, calculate the value of V when $r = 4.26$, $H = 21.58$ and $h = 14.35$.

(a) Give the full calculator display.

(b) Give your answer to two decimal places.

(c) Give your answer to two significant figures.

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

(Total 8 marks)

10. A rectangle has length 2.6×10^4 and width 1.9×10^4. Find each of the following, giving your answer in the form $a \times 10^k$, where $1 \le a < 10$ and $k \in \mathbb{Z}$.

(a) The area of the rectangle;

(b) The perimeter of the rectangle.

(Total 8 marks)