

Complete all work on notebook paper.

1. Review the laws of exponents. You can complete extra problems that were not assigned on pg 76-80.

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

$$1.775 - \frac{\sqrt{1.44}}{48}$$

$$1.775 - .025 = 1.75$$

(a) calculate the value of  $p$ .

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.

$$\begin{aligned} x &= 2 \\ y &= 1 \\ z &= 50 \end{aligned}$$

$$2 - \frac{\sqrt{1}}{50}$$

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

$$2 - .02 = 1.98$$

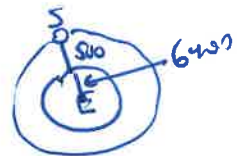
(c) Calculate the percentage error in Barry's estimate of the value of  $p$ .

$$\frac{1.98 - 1.75}{1.75} \cdot 100 = 13.1\%$$

3. 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.

$$6400\text{km} + 500\text{km} = 6900\text{km}$$



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

$$\begin{aligned} A &= \pi r^2 \\ C &= 2\pi r \end{aligned}$$

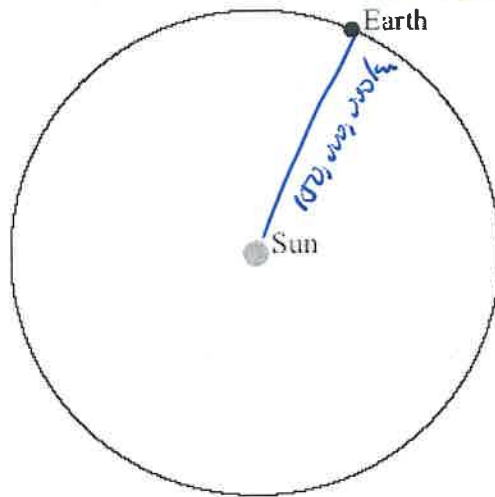
$$\begin{aligned} P &= 2\pi(6900\text{km}) \\ P &= 43,353.97862 \end{aligned}$$

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

$$4.3354 \cdot 10^4 \text{ km}$$

$$P = 43,354 \text{ km}$$

4. 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.



$$r = 150,000,000 \text{ km}$$

$$C = 2\pi(150,000,000 \text{ km})$$

$$C = \frac{942,477,796.1 \text{ km}}{1 \text{ yr}}$$

$$\frac{942,477,796.1 \text{ km}}{1 \text{ yr}} \cdot \frac{1 \text{ yr}}{365 \text{ days}}$$

diagram not to scale

$$a) \frac{2,582,130,948 \text{ km}}{1 \text{ day}}$$

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

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

$2.582130 \times 10^6$

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

So  $V = \sqrt{\frac{(500 \text{ cm}^2)^3}{36\pi}} = \sqrt{1105242.66 \text{ cm}^6}$

The surface area of a sphere is  $500 \text{ cm}^2 = S$

$= 1051.305217 \text{ cm}^3$

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

$1051.31 \text{ cm}^3$

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

$1051 \text{ cm}^3$

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

$1.051 \times 10^3 \text{ cm}^3$

6. Let  $x = 7.94$ .

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

$\frac{2(7.94) + 1}{(7.94)^3} = \frac{16.88}{500.566184} = 0.033722$

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

$0.034$

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

$0.034 \cdot 100 = 3.4\%$

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

$0.034 \approx 3.4 \cdot 10^{-2}$

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.

$\frac{4.24 \text{ kg}}{256 \text{ pencils}} = 0.016563$

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

$0.0166$

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

$1.66 \cdot 10^{-2}$

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

Find

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

$\frac{6.4 \cdot 10^7}{1.6 \cdot 10^8} = 4 \cdot 10^{-1}$  or  $4.0 \cdot 10^{-1}$

(b)  $y - 2x$

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

$1.6 \cdot 10^8 - 2(6.4 \cdot 10^7)$

$1.6 \cdot 10^8 - 12.8 \cdot 10^7$

$1.6 \cdot 10^8 - 1.28 \cdot 10^8 = 0.32 \cdot 10^8$

$\approx 3.20 \cdot 10^7$

25%  
≈  
2.50 · 10<sup>2</sup>  
more left  
exp ↑