

Topic: Scientific Notation

09.01

$$\begin{aligned} \text{seconds in a year} &= 60 \times 60 \times 24 \\ &\quad \times 365 \\ &= 31536000 \end{aligned}$$

$$\begin{aligned} \text{Profit} &= 3.2 \times 10^9 \times 31536000 \\ &= 1.009152 \times 10^{17} \\ &= \underline{\underline{1.01 \times 10^{17}}} \text{ to 3sf} \end{aligned}$$

09.02

$$\begin{aligned} &7.1 \times 10^7 \div 300 \\ &= 236666.6 \\ &= 240000 \text{ to 2sf} \\ &= 2.4 \times 10^5 \text{ to 2sf} \\ &\quad \underline{\underline{\text{miles}}} \end{aligned}$$

09.03

$$\frac{\text{water}}{\text{total}} \times 100$$

$$\frac{1.41 \times 10^{18}}{5.97 \times 10^{21}} \times 100$$

$$= \underline{\underline{2.36 \times 10^{-2} \%}}$$

09.04

$$\begin{aligned} &19.06 \times 10^{-5} \times 18 \\ &= \underline{\underline{3.4308 \times 10^{-3}}} \end{aligned}$$

09.05

$$\begin{aligned} \text{minutes in a year} &= 60 \times 24 \times 365 \\ &= 525600 \end{aligned}$$

$$\begin{aligned} &525600 \times 10000 \\ &= 5256000000 \\ &= \underline{\underline{5.256 \times 10^9}} \end{aligned}$$

09.06

$$C = \pi d \quad d = 2 \times r$$

$$C = \pi \times 2 \times 4.96 \times 10^7$$

$$C = 311.017672.7$$

$$C = \underline{\underline{3.11 \times 10^8}} \text{ to 3sf}$$

Topic: Scientific Notation

09.07

$$\begin{aligned} D &= S \times T \\ &= 3 \times 10^8 \times 8 \\ &= 2400000000 \\ &= \underline{\underline{2.4 \times 10^9 \text{ m}}} \end{aligned}$$

09.08

$$\begin{aligned} E &= mc^2 \\ E &= 3.6 \times 10^{-2} \times 3 \times 10^8 \\ E &= 10800000 \\ E &= \underline{\underline{1.08 \times 10^7}} \end{aligned}$$

09.09

grams atoms

$$\begin{aligned} & \div 3.27 \times 10^{22} \rightarrow 1 \\ & \times 1000 \rightarrow 1000 \text{g (1kg)} = 3.06 \times 10^{24} \\ & \times 1000 \rightarrow 3.06 \times 10^{24} \end{aligned}$$

$\underline{\underline{3.1 \times 10^{24}}}$ atoms to 2sf

09.10

5th June → 29th Sept

$$26 + 31 + 31 + 29 = 117 \text{ days}$$

$$(2.925 \times 10^7) \div 117$$

$$= 250000$$

$$= \underline{\underline{2.5 \times 10^5}} \text{ per day}$$

09.11

$$\begin{aligned} S &= ? \\ D &= \pi \times 1.2 \times 10^7 \text{ km} \\ T &= 88 \times 24 \text{ hours} \end{aligned}$$

$$S = \frac{D}{T}$$

$$= \frac{\pi \times 1.2 \times 10^7}{88 \times 24}$$

$$= 17849.958$$

$$= \underline{\underline{1.8 \times 10^4}} \text{ kmph to 2sf}$$

09.12

$$50000000 \times 9.46 \times 10^{12}$$

$$= \underline{\underline{4.73 \times 10^{20}}} \text{ km}$$

Topic: Scientific Notation

09.13

Variation question, no longer in course.

Removed from original booklet

09.14

09.13 in new booklet

a) $V = \frac{4}{3} \pi r^3$

$$V = \frac{4}{3} \times \pi \times 6400^3$$

$$V = 1.1 \times 10^{12} \text{ to 2 sf}$$

b) $(1.1 \times 10^{12}) \div (2.2 \times 10^{10})$

$$= \underline{\underline{50}} \text{ times greater}$$