Standard Form Using Calculator

Example $(3.16 \times 10^{17}) \times (2.4 \times 10^{12})$

| 3 | . | 1 | 6 | $\times 10^x$ | 1 | 7 | $\times$ | 2 | . | 4 | $\times 10^x$ | 1 | 2 | = | | |

Exp   Exp

$$= 7.584 \times 10^{29}$$

or $= 7.584 E29$ which means

$$7.584 \times 10^{29}$$

Ex2 $(3.16 \times 10^{17})^2 = 9.9856 \times 10^{34}$

Vol of Earth

Vol of Sun 1.4×10^{27} m^3

Radius of Earth $= 6371$ km

Vol of Earth $= \frac{4}{3} \pi r^3$

$$= \frac{4}{3} \pi \times 6371000^3$$

$$= 1.083 \times 10^{21} \text{ m}^3$$

How many times is the volume of the sun greater than the volume of the earth

$$\underline{\text{Vol of Sun}} = \underline{1.4 \times 10^{27}}$$

Vol of Earth 1.083×10^{21}

$\qquad = 1,292,705.448$

$\qquad = 1.3$ million

or $\qquad 1.3 \times 10^6$

Blue Textbook Exercise 10H Pages 222-223

6) 20 000 000 000 000 red corpuscles

$\qquad = 2 \times 10^{13}$

Each weighs   0.000 000 000 1 g

$\qquad = 1 \times 10^{-10}$

Total mass $\quad = 2 \times 10^{13} \times 1 \times 10^{-10}$ g

$\qquad = 2 \times 10^3$ g

or 2 kg

Exercise

Q5 all parts

a) $2.7 \times 10^4 \div 5 \times 10^2 = 54$

Q8

Q10

Q9

5 Work out the following. Give your answers in standard form, rounding off to an appropriate degree of accuracy where necessary.

a $2.7 \times 10^4 \div 5 \times 10^2$

b $2.3 \times 10^4 \div 8 \times 10^6$

c $3.2 \times 10^{-1} \div 2.8 \times 10^{-1}$

d $2.6 \times 10^{-6} \div 4.1 \times 10^3$

e $\sqrt{(8 \times 10^4)}$

f $\sqrt{(30 \times 10^{-4})}$

g $5.3 \times 10^3 \times 2.3 \times 10^2 \div 2.5 \times 10^3$

h $1.8 \times 10^2 \times 3.1 \times 10^3 \div 6.5 \times 10^{-2}$

6 A typical adult has about 20 000 000 000 000 red corpuscles. Each red corpuscle weighs about 0.000 000 000 1 gram. Write both of these numbers in standard form and work out the total mass of red corpuscles in a typical adult.

7 If a man puts 1 grain of rice on the first square of a chess board, 2 on the second square, 4 on the third, 8 on the fourth and so on,

a how many grains of rice will he put on the 64th square of the board?

b how many grains of rice will there be altogether?

Give your answers in standard form.

8 The surface area of the Earth is approximately 2×10^8 square miles. The surface area of the earth covered by water is approximately 1.4×10^8 square miles.

a Calculate the surface area of the Earth not covered by water. Give your answer in standard form.

b What percentage of the Earth's surface is not covered by water?

9 The moon is a sphere with a radius of 1.080×10^3 miles. The formula for working out the surface area of a sphere is

Surface area = $4\pi r^2$

Calculate the surface area of the moon.

10 Evaluate $\dfrac{E}{M}$ when $E = 1.5 \times 10^3$ and $M = 3 \times 10^{-2}$, giving your answer in standard form.

11 Work out the value of $\dfrac{3.2 \times 10^7}{1.4 \times 10^2}$ giving your answer in standard form, correct to two significant figures.