



- 1 a. Write 8.14×10^4 as an ordinary number.
b. Write 0.00092 in standard form.

(2 marks)

Standard form is $a \times 10^n$, where $1 \leq a < 10$ for these positive numbers and n is an integer. A negative power means divide by a power of 10

a) Multiplying by 10^4 moves the digits four places

$$8.14 \times 10^4 = 81,400$$

$$b) 0.00092 = 9.2 / 10,000 = 9.2 \times 10^{-4}$$

- 2 Write 45 000 000 in standard form.

(1 mark)

Number between 1 and 10: 4.5

Decimal point moves 7 places

$$4.5 \times 10^7$$

- 3 Write 0.00032 in standard form.

(1 mark)

Number between 1 and 10: 3.2

Decimal point moves 4 places

Small number: negative power

$$3.2 \times 10^{-4}$$

- 4 a. Write 507,000 in standard form.

- b. Write 2.6×10^{-3} as an ordinary number.

(2 marks)

$$a) 507,000 = 5.07 \times 100,000 = 5.07 \times 10^5$$

$$b) 2.6 \times 10^{-3} = 2.6 / 1000 = 0.0026$$

- 5 Ravi writes 56 000 as 56×10^3 .

Is this in standard form? Give a reason, and write 56 000 correctly in standard form.

(2 marks)

First number must be between 1 and 10

56 is too big, so not standard form

$$5.6 \times 10^4$$

6 Write each number in standard form.

a. 830 000

b. 0.0705

(2 marks)

a)

8.3, point moves 5 places

$$8.3 \times 10^5$$

b)

7.05, point moves 2 places, small number

$$7.05 \times 10^{-2}$$

$$\boxed{a) 8.3 \times 10^5 \quad b) 7.05 \times 10^{-2}}$$

7 Here are four numbers.

A: 3.4×10^5 B: 0.6×10^{-2} C: 12×10^3 D: 9.99×10^{-7}

Write down the letters of the numbers that are in standard form.

(2 marks)

A: 3.4 is between 1 and 10 - yes

B: 0.6 is less than 1 - no

C: 12 is more than 10 - no

D: 9.99 is between 1 and 10 - yes

$\boxed{A \text{ and } D}$

8 Write each of these in standard form.

a. A virus is 0.00000012 m across.

b. The population of India is about 1 400 000 000.

(2 marks)

a)

1.2, point moves 7 places, small number

$$1.2 \times 10^{-7}$$

b)

1.4, point moves 9 places

$$1.4 \times 10^9$$

$$\boxed{a) 1.2 \times 10^{-7} \quad b) 1.4 \times 10^9}$$

- 9 A grain of sand has width 2×10^{-3} m, a speck of pollen has width 1.8×10^{-4} m and a dust particle has width 5×10^{-5} m.
- Write the three objects in order of size, smallest first.
 - Write the ratio of the width of the sand grain to the width of the dust particle in the form $n : 1$. (4 marks)

a) smaller power = smaller number

$$5 \times 10^{-5} < 1.8 \times 10^{-4} < 2 \times 10^{-3}$$

dust, pollen, sand

b)

$$0.002 : 0.00005$$

$$= 200 : 5$$

$$\boxed{b) 40 : 1}$$

- 10 Write these numbers in order of size, starting with the smallest.

$$3.2 \times 10^4 \quad 2.9 \times 10^5 \quad 8.7 \times 10^3 \quad 3.05 \times 10^4$$

(2 marks)

As ordinary numbers

$$3.2 \times 10^4 = 32,000; 2.9 \times 10^5 = 290,000; 8.7 \times 10^3 = 8,700;$$

$$3.05 \times 10^4 = 30,500$$

Order smallest first: 8,700; 30,500; 32,000; 290,000

So: 8.7×10^3 , 3.05×10^4 , 3.2×10^4 , 2.9×10^5

- 11 a. Write 0.0698 in standard form.
- b. Which is greater, 7.3×10^{-2} or 0.0698?
You must show your working.

(3 marks)

$$a) 0.0698 = 6.98 / 100 = 6.98 \times 10^{-2}$$

b) $7.3 \times 10^{-2} = 0.073$. Comparing 0.073 with 0.0698: 0.073 is larger

b) So 7.3×10^{-2} is greater