Higher IGCSE homework Week 1

1 Correct the following to i) 1 significant figure and ii) 3 significant figures

a) 4,278 b) 6,708,326 c) 27.439 d) 0.00329814 e) 8,023,942

2 Correct the following to i) 1 decimal place and ii) 3 decimal places

a) 0.26821 b) 25.17557 c) 0.07692 d) 43.01928

3 Simplify the following

a) $a^8 \times a^5$ b) $a^7 \times a^{-2}$ c) $b^{--4} \times b^{12}$ d) $c^8 \div c^4$ e) $c^9 \div c^{11}$ f) $r^{-6} \div r^2$

g) $t^9 \div t^{-6}$ h) $(a^4)^2$ i) $(a^{12})^{1/2}$ j) $(a^{-3})^5$ k) $(a^3 \times a^7 \div a^4)^2$

4 Write the numbers out in full a) 10^5 b) 10^1 c) 10^{-2} d) 10^0

5 Write down the value of x

a) $10^x = 10{,}000$ b) $10^x = 0.001$ c) $10^x = 1{,}000{,}000{,}000$ d) $10^{-x} = 0.00001$

6 Which of these numbers are in standard form?

A 1.2×10^5 B 36.6×10^3 C 0.7×10^7 D 2.9 billion E 6.12×10^{-6}

For the numbers above that aren't correct standard form, write them in standard form

7 Write these numbers out as ordinary numbers

a) 2.5×10^6 b) 5.2×10^4 c) 7.46×10^3 d) 9.51×10^{-3}

e) 1.2×10^8 f) 6.54×10^{-5}

8 Now write these numbers as standard form

a) 6,000 b) 46 c) 840,000 d) 0.0042

e) 220,000,000 f) 0.00000364

9 Work out the final powers of 10

a) $10^3 \times 10^6$ b) $10^{-9} \times 10^5$ c) $10^{15} \div 10^{11}$ d) $10^3 \div 10^{-7}$ e) $10^{-8} \div 10^{-7}$

10 Work out the following writing your answers in Standard Form

a) $(2 \times 10^3) \times (4 \times 10^6)$ b) $(4 \times 10^2) \times (3 \times 10^4)$ c) $(6.83 \times 10^5) \times (1.3 \times 10^9)$

d) $(8 \times 10^{-6}) \times (2.4 \times 10^{15})$ e) $(9 \times 10^7) \div (3 \times 10^4)$ f) $(9 \times 10^{17}) \div (2 \times 10^5)$

g) $(2.3 \times 10^3) \div (4.6 \times 10^{-8})$ h) $(2 \times 10^4)^2$ i) $(3 \times 10^{-5})^3$

11 Now work out these, be careful of the powers!

a) $(2.6 \times 10^3) + (4.2 \times 10^3)$ b) $(4.1 \times 10^5) + (3.8 \times 10^4)$ c) $(7.2 \times 10^{-12}) + (2.4 \times 10^{-13})$

d) $(8.6 \times 10^3) - (5.2 \times 10^3)$ e) $(9.3 \times 10^5) - (2.7 \times 10^4)$ f) $(9.8 \times 10^{-3}) - (4.1 \times 10^{-4})$

12 The thickness of a sheet of paper is 0.00007 m

a) write this in standard form b)what is this in i) cm and ii) mm

c) How thick is a pile of 5000 sheets of paper in metres in standard form?

13 A water molecule has a mass of 3×10^{-29} kg. A bottle contains 1.7×10^{28} molecules of water. Calculate the mass of the water

14 Some Calculator work give your answers correct to 3 significant figures

a) $(7.8^2 + 17.3) \div 3.1$ b) $5\ 4/7 + 8\ 2/3$ c) $\sqrt{(3.5 + 2.3)} \div 4.8^3$

15 Estimate the answers to these calculations

a) 19.8 x 4.2 b) (7.33 + 12.95) x 0.213 c) 315.82 ÷ 0.53 e) 2.12^3

16 Now estimate using standard form to calculate these,
giving your answer in standard form correct to 1 significant figure

a) 3250 x 420 b) 8320 ÷ 0.00019 c) 72,345,761 x 0.0089

17 Estimate the volume of a cuboid of dimensions 7.8cm x 5.2cm x 14.9cm

18 Estimate the area

Is your estimation an over estimation or an under estimation? Why?

19 Complete the table finding the Upper Bounds and Lower Bounds

Dimension	Rounded to nearest	Lower Bound	Upper Bound	Dimension as a ± b
480m	10m	475m	485m	480 ± 5m
720 km	10 km			
12.5 cm	0.1 cm			
57 kg	1 kg			
7600g	100g			
85 litres	5 litres			
82.6 mm	0.1 mm			
___m	___m	54.5 m	55.5 m	
___g	___g	642.5 g	647.5 g	

20 A dog weighs 12kg to the nearest kg. What are the upper & lower bound weights for the weight of the dog?

21 A rectangular carpet measure 7m by 3m to the nearest m Calculate

a) the upper and lower bounds for the perimeter of the carpet

b) the upper and lower bounds for the area of the carpet

22 Given that a = 1.2 correct to 1 decimal point and b = 3.7 corrct to 2 significant figures
Calculate to 3 sig figs

a) the upper bound of a x b b) the upper bound of b ÷ a

iii) the lower bound of b ÷ (2 - a)

23 A square has a side length of 6.7 cm correct to 1 decimal place.
Find correct to 3 significant figures a) the upper bound for it's area and

b) the lower bound of it's diagonal length

24 A circle has an area of 6.4 cm correct to 2 significant figures
Find correct to 3 significant figures a) the upper bound of it's radius

b) the lower bound of it's circumference