

## Foundation Check In - 3.02 Standard form

Do not use a calculator for questions 1-6.

1. The population of London is approximately  $8.63 \times 10^6$  and the population of New York City is approximately 8.5 million. Which is greater and by how many? Give your answer in standard form.

Work out the following, giving your answers in standard form:

2.  $(3.2 \times 10^1) \times (5 \times 10^{-1})$ .

3. Subtract  $5.2 \times 10^{-1}$  from  $2.5 \times 10^2$ .

4.  $\frac{(1.6 \times 10^2)}{(8 \times 10^4)}$ .

5. 1 g is equal to 1000 mg. Change  $4.56 \times 10^5$  milligrams to grams.

6.  $v = \frac{p+q+r}{pq}$ .

Show that the value of  $v$  is  $5 \times 10^{-5}$  when  $p = 3 \times 10^4$ ,  $q = 2 \times 10^5$  and  $r = 7 \times 10^4$ .

7. The table below shows data for the UK about its population and household spending for 2005 and 2010.

Year	Population	Total household spending (£)
2005	$6.04 \times 10^6$	$1.93 \times 10^9$
2010	$6.28 \times 10^6$	$2.29 \times 10^9$

Comment on how household spending **per person** has changed in five years.

8. A local council intends to bulk buy large quantities of heating oil for the next five years. Two heating oil companies have provided the following quotes.

Home Heating	Value Fuels
$8 \times 10^4$ litres for £27 200	$1.2 \times 10^3$ hectolitres for £43 200 (1 hectolitre is equal to 100 litres)

Which company is offering the best value for money? Show all your working.

9. The speed of radio waves is  $3 \times 10^8$  metres per second. Without using a calculator, work out how long it will take for a radio wave to travel 1 200 000 km.



# GCSE (9–1) MATHEMATICS

10. The diameter of the Earth is  $1.2756 \times 10^4$  km and the radius of the Sun is  $6.957 \times 10^5$  km. Work out how many times greater the circumference of the Sun is compared to the Earth. Give your answer in standard form correct to 2 significant figures.

## Extension

The population of a town is  $5.83 \times 10^4$ . Eighteen per cent of this population are children under the age of 16. Without using a calculator, work out the number of children under the age of 16. Give your answer in standard form.



## Answers

1. The population of London is greater by  $1.3 \times 10^5$  people.
2.  $1.6 \times 10^1$
3.  $2.4948 \times 10^2$
4.  $2 \times 10^{-3}$
5.  $4.56 \times 10^2$  grams
6. 
$$v = \frac{(3 \times 10^4) + (2 \times 10^5) + (7 \times 10^4)}{(3 \times 10^4) \times (2 \times 10^5)}$$
$$v = \frac{(0.3 \times 10^5) + (2 \times 10^5) + (0.7 \times 10^5)}{6 \times 10^9}$$
$$v = \frac{3 \times 10^5}{6 \times 10^9}$$
$$v = 0.5 \times 10^{-4}$$
$$v = 5 \times 10^{-5}$$
7. Household spending per person increased from £319.54 in 2005 to £364.65 in 2010.
8.  $\frac{27200}{8 \times 10^4} = 0.34$  and  $\frac{43200}{1.2 \times 10^5} = 0.36$  oe. Home Heating is better value at 34p per litre.
9. 4 seconds
10.  $1.09 \times 10^2$  times bigger

## Extension

$1.0494 \times 10^4$  are children under the age of 16.



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Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Interpret and subtract numbers in standard form, without a calculator			
AO1	2	Multiply numbers in standard form, without a calculator			
AO1	3	Subtract numbers in standard form, without a calculator			
AO1	4	Divide numbers in standard form, without a calculator			
AO1	5	Convert between units of measure in standard form			
AO2	6	Perform calculations with numbers in standard form, without a calculator			
AO2	7	Use a calculator to perform calculations with numbers in standard form			
AO2	8	Use a calculator to perform calculations with numbers in standard form			
AO3	9	Solve a worded problem with numbers in standard form			
AO3	10	Solve a worded problem with numbers in standard form			

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