



GCSE MATHEMATICS

S21-C300

Non-Calculator Assessment Resource P

Higher Tier

Formula list

Area and volume formulae

Where r is the radius of the sphere or cone, l is the slant height of a cone and h is the perpendicular height of a cone:

Curved surface area of a cone =
$$\pi rl$$

Surface area of a sphere = $4\pi r^2$
Volume of a sphere = $\frac{4}{3}\pi r^3$
Volume of a cone = $\frac{1}{3}\pi r^2h$

Kinematics formulae

Where *a* is constant acceleration, *u* is initial velocity, *v* is final velocity, *s* is displacement from the position when t = 0 and *t* is time taken:

v = u + at $s = ut + \frac{1}{2}at^{2}$ $v^{2} = u^{2} + 2as$

1. Peter and Paula record the number of cars in each of two airport car parks, A and B, between 8 a.m. and 12 noon one Saturday morning. This was done to find out if there was a peak time for parking during that period.

The table shows the data they collected.

Time	8a.m.	9a.m.	10 a.m.	11 a.m.	12 noon
Number of cars in car park A	178	179	183	180	179
Number of cars in car park B	176	175	181	177	176

Paula draws this graph to represent the data.



Peter says,

"This graph is not sensible as it does not show the data fairly."

(a)	What has been done in the drawing of the graph that has made Peter think this?	[1]
(b)	What error might this lead to, for people who do not look carefully at the graph?	[1]
•••••		••••••

2. Ivan is part of a team making bags of free items to give away at a college open evening.

He has:

- 140 discount vouchers, •
- 56 pencils,280 sweets

to share between all his bags.

He uses **all** the vouchers, **all** the pencils and **all** the sweets. He makes as many bags as possible. The contents of each bag are the same.

How many bags does Ivan make and what does eac	h bag contain?	[5]
Ivan makes	bags containing	
vouchers,	pencils,	. sweets.

(a)	Sim	plify $\frac{x^2 \times x^7}{x^3}$.	[2]
(b)	(i)	Find the positive value of $16^{\frac{1}{4}}$.	[1]
	 	Find the value of $27^{\frac{4}{3}}$	[2]
			[4]
	······		

3.

(C)	Estimate the value of $(3.9 \times 10^6)^3$. Give your answer in standard form. [3	3]
		•••
		•••
	Estimate	-1
(0)	where $\sqrt{6}$ in the form $a\sqrt{6}$ where a is an integer. [2	-]
		•••

4. A tennis club has 240 members. They each played a senior, main or junior event in one of three competitions, *A*, *B* or *C*.

Of the club members:

- 110 played in A,
- 30 played in a junior event,
- 25 played in the senior event in *B*,
- no junior played in C,
- 40 of those who played in C were in the main event.

The number of members who played in a senior event was 150% more than those who played in a junior event.

The ratio of members who played in B and C was B: C = 6: 7.

The probability that a member played in the junior event in A was 0.1.

A member is selected at random from the club.

Use the table to help you to find the probability that this member played in a Main event or played in B but not both.

You must show all your working.

[6]

	Senior	Main	Junior	Totals
А				
В				
С				
Totals				

 •••••••••••••••••••••••••••••••••••••••

Probability =

5.	Write 7·341 as a fraction.	[2]

$\langle \alpha \rangle$	Find the number of different ways in which this can be done	
(a)	The the number of different ways in which this can be done.	
•••••		
•••••		
(b)	One of her tokens is pink and another is green.	
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 $f(x) = \sqrt{x-1}$ for $x \ge 1$. **7**. (a)

Show that $f^{-1}(x) < 1$ has no solutions.

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[3]

 $(b) \quad g(x) = 5^x$ h(x) = x + 3Solve $gh(x) = \frac{1}{25}$. [4]

8. In this question, all lengths are in centimetres.



Diagram not drawn to scale

The diagram shows a sketch of a circle, centre *O*. Points *A*, *B*, *C*, *D*, *E* and *F* lie on the circumference of the circle. Triangles *AOB*, *BOC*, *COD*, *DOE*, *EOF* and *FOA* are congruent.

The circle has equation $x^2 + y^2 = \frac{25}{4}$.

Calculate the perimeter of the hexagon *ABCDEF*. You must justify any decisions that you make.

[4]