GCSE   MATHEMATICS

S21-C300

With Calculator Assessment Resource F

Foundation 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:

$$\text{Curved surface area of a cone} = \pi r l$$

$$\text{Surface area of a sphere} = 4\pi r^2$$

$$\text{Volume of a sphere} = \frac{4}{3}\pi r^3$$

$$\text{Volume of a cone} = \frac{1}{3}\pi r^2 h$$

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. A sign in a shop shows the cost of sending letters and parcels.

What are you sending?	Class	Cost
Small letter	1st	67p
	2nd	58p
Large letter	1st	£1.01
	2nd	79p
Small parcel	1st	£3.45
	2nd	£2.95
Medium parcel	1st	£5.75
	2nd	£5.05

Customers can choose 1st or 2nd class post for different sizes of letter or parcel.

(a) What is the cost of sending 5 small letters, using 1st class post? [1]

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(b) Helen always uses first class post.
She makes a large letter into a small letter by folding it in half.

How much money does this save? [2]

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(c) Brad sends:
- 3 small parcels using 2nd class post,
- 2 medium parcels using 1st class post.

How much does Brad pay to send all 5 parcels? [2]

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Brad pays £ ....

2. There are:
- 28 days in February,
- 52 weeks in a year.

(a) Emile is given £8.12 pocket money every week.

How much pocket money is Emile given in a whole year? [1]

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(b) For this year, Catrin is given £7.35 pocket money every week.

(i) How much pocket money is Catrin given in February? [2]

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(ii) Catrin multiplies the total for February by 12.

This method will not give the correct amount for the whole year.
Why not? [1]

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(c) Each morning, Aled is given 95p pocket money.
He saves all his pocket money from 1st February until the 15th March.

Will Aled have saved enough money to pay £40 for a concert ticket on the evening of the 15th March?
You must show all your working. [3]

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3. *(a)* (i) Simplify $9a - 1 - 6a + 8$. [2]

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(ii) Expand $3(x + 2)$. [2]

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(b) Solve each of the following.

(i) $x + 6 = 15$ [1]

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(ii) $\dfrac{y}{7} = 6$ [1]

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(c) $v = u + at$

Find v when $u = -2$, $a = 6$ and $t = 3$. [2]

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4. *(a)* Estate agents help people sell their houses.
They charge people for the help that they provide.

Bilal plans to sell his house for £146 000.
He has a choice of these two estate agents:

Blue Blocks Estate Agent	*Sell 'em Fast* Estate Agent
Fixed Charge £1420 + 20% VAT	Charge 1·25% of the selling price

Bilal wants to pay as little as possible to the estate agent.

Which estate agent should Bilal choose?
You must show all your working. [4]

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Bilal should choose ....

(b) Stamp duty is a tax that is paid when houses are purchased (bought).

For houses purchased up to £925000, the stamp duty is calculated as follows:
- 0% on the first £125000 of the purchase price,
- 2% on the next £125000 of the purchase price,
- 5% on the next £675000 of the purchase price.

An example to calculate the stamp duty on a house with a purchase price £275000.

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Example
House purchased for £275000, the stamp duty is calculated as follows:

        0% on the first      £125 000      £    0
        2% on the next       £125 000      £2500
        5% on the next       £  25 000     £1250

        Total stamp duty on  £275 000      £3750
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Mr Evans is asked to pay stamp duty of £12000 when he buys a new house.
He pays £380 000 for his new house.

Is the stamp duty he is asked to pay correct?
You must show all your working.   [3]

Correct ☐   Incorrect ☐

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5. The table below gives information from the Highway Code on stopping distances for cars.

Speed	Stopping distance in metres = Thinking distance + Braking distance (Thinking distance is given first, followed by Braking distance)
20 mph	6 m 6 m
30 mph	9 m 14 m
40 mph	12 m 24 m
50 mph	15 m 38 m

Remember 50 mph is 80 km/h.

The stopping distances given in the Highway Code assume good driving conditions and alert drivers.

When a driver is tired and the road is wet, the thinking distance increases by 30% and the braking distance increases by 20%.

A tired driver travels at 64 km/h in wet driving conditions.

Calculate their stopping distance in metres.   [4]

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6. *(a)* In Queenbridge, the mean daily snowfall for a week was 1·6 cm.
If there had been 1 cm more snowfall on each day, what would the mean daily snowfall
have been? [1]

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(b) In Sansburg, the snowfall for each of the first 10 days in January was measured.
The results are summarised in the table below.

Daily snowfall, s in cm	Number of days
$1 \cdot 5 \leqslant s < 2 \cdot 5$	4
$2 \cdot 5 \leqslant s < 3 \cdot 5$	2
$3 \cdot 5 \leqslant s < 4 \cdot 5$	1
$4 \cdot 5 \leqslant s < 5 \cdot 5$	0
$5 \cdot 5 \leqslant s < 6 \cdot 5$	3

Calculate an estimate for the mean daily snowfall for these 10 days. [4]

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(c) During the first 5 days of February, the mean snowfall in Awezell was 4·7 cm.
On 6th February the snowfall was 23·9 cm.

Calculate the mean snowfall for the first 6 days of February. [3]

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