GCSE MATHEMATICS

S21-C300

Non-Calculator Assessment Resource H

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:

Curved surface area of a cone = πrl

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

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

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

Kinematics formulae

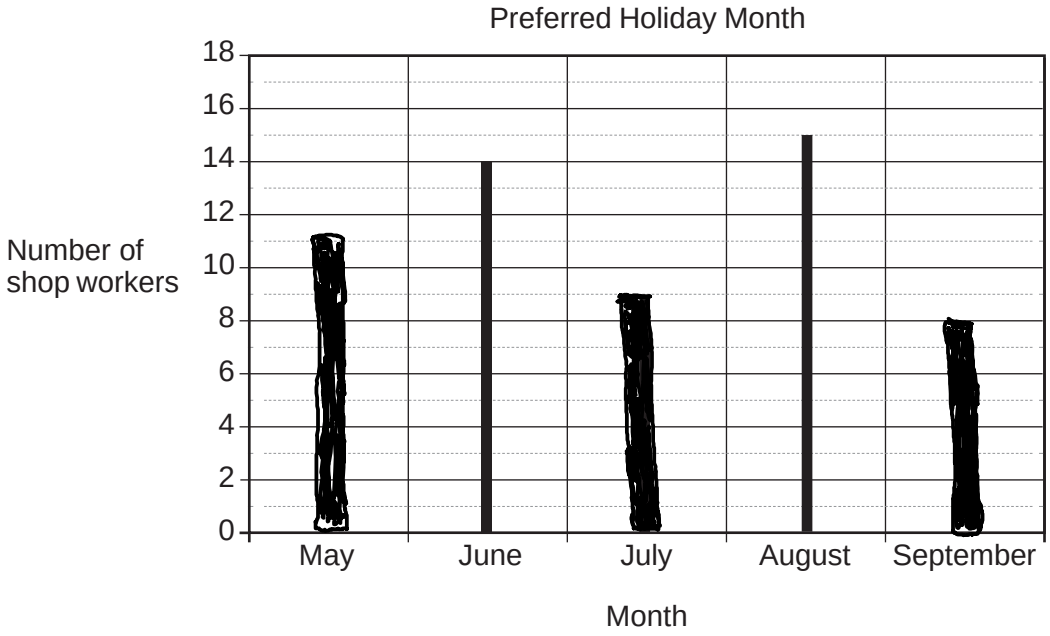
Where a is constant acceleration, u is initial velocity, v is final velocity, s is displacement from the position when $t = 0$ and t is time taken:

$$v = u + at$$

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

$$v^2 = u^2 + 2as$$

1. Some workers in a large shop were asked to choose the month in which they would like to take a holiday.
Each worker chose a month from May to September.
The vertical line graph and pictogram each show the results for three of the five months.



May				
June				
July				
August				
September				

Key: ▭ represents ....4.... shop workers.

(a) Complete the vertical line graph, pictogram and key. [3]

(b) How many shop workers were asked? [1]

57 15+14+9+8+11

(c) Write down the modal month. [1]

August

2. The timetable shows some bus times from Newland to Broadacre.

Service	X1	X1	X1	X1	X1
Newland bus station	08:10	09:10	10:15	11:15	12:15
St Mary's hospital	08:17	09:17	10:22	11:22	12:22
Highview castle	08:40	09:40	10:45	11:45	12:45
Whiteview shopping centre	09:09	10:09	11:14	12:14	13:14
Broadacre bus station	09:34	10:34	11:39	12:39	13:39

(a) Sid is meeting his friend at Whiteview shopping centre at 1:30 p.m.

What is the time of the latest bus he can take from Newland bus station? [1]

12:15

(b) Pam takes the 08:40 bus from **Highview castle** to Broadacre bus station. The bus leaves Highview castle on time, but arrives at Broadacre bus station 15 minutes late.

How many minutes does Pam's journey take? [2]

Meant to arrive 9:34 so 54 minutes

54 + 15 = 109 minutes

109 minutes

3. Gemma has her kitchen floor tiled.
The pattern is made up of 80 cream tiles and 24 green tiles.

(a) Write the ratio of cream tiles to green tiles in its simplest form. [2]

C : G

80 : 24 ÷8

10 : 3 ÷8

cream tiles : green tiles = 10 : 3

(b) Gemma then has her hallway tiled with cream tiles.
For the kitchen **and** hallway, the ratio of cream tiles : green tiles is 19 : 3.

How many cream tiles were used altogether to tile the kitchen **and** hallway? [2]

C : G

19 : 3

24 = 3 pts

8 = 1 part

8 × 19 = 160 − 8 = 152

(c) Gemma was quoted £820 to have her kitchen tiled.
Tiling the hallway increased this by 70%.

By how much did her quote increase? [2]

$\frac{820}{10} = 82 = 10.1$

82 × 7 = 70.1

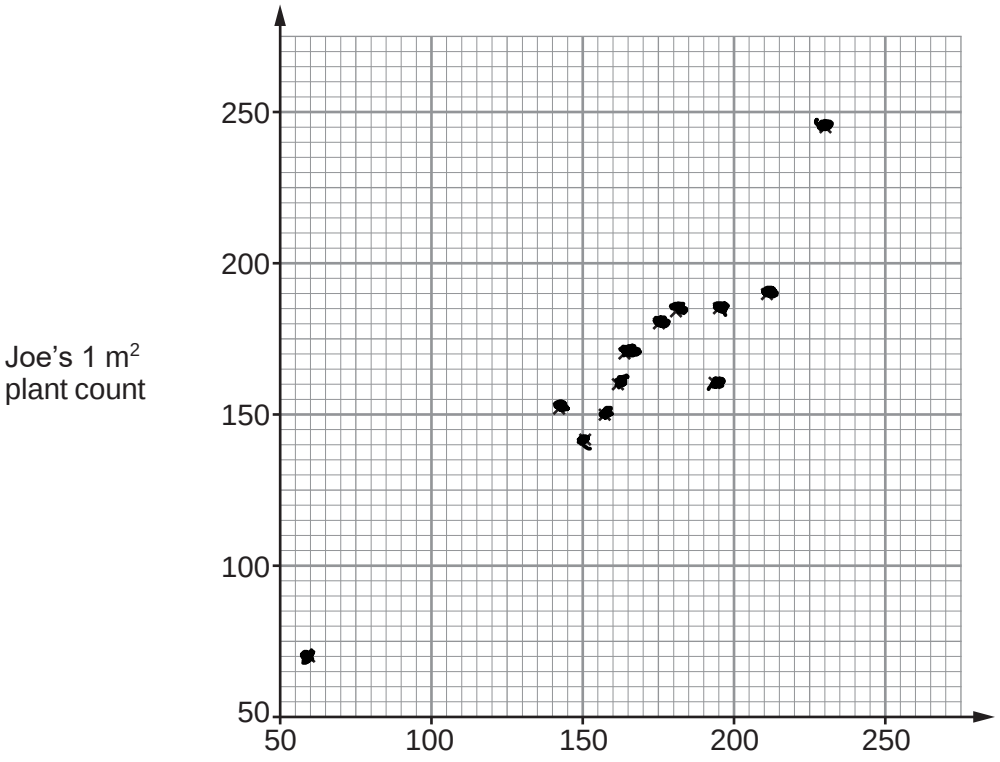
80 × 7 = 560

2 × 7 = 14

574

4. A town council has 12 wildflower beds.
Meera and Joe count the number of yellow rattle plants in a **different** 1 m^2 section of each wildflower bed.

Their results are shown in the scatter diagram.



(a) In one of the beds, both Meera and Joe counted many more yellow rattle plants than in the other beds.

Calculate the difference between Joe's plant count and Meera's plant count for this bed.
[1]

245 − 230 = 15 more for Joe

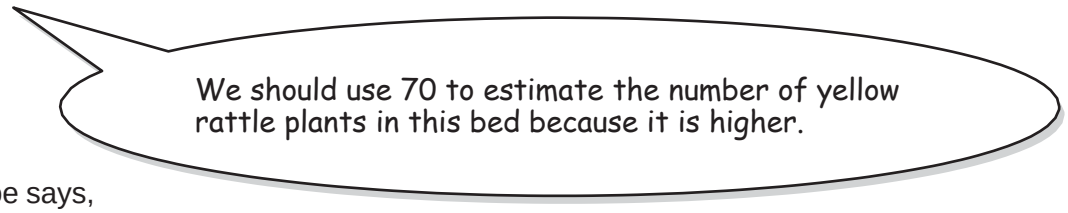
.....

.....

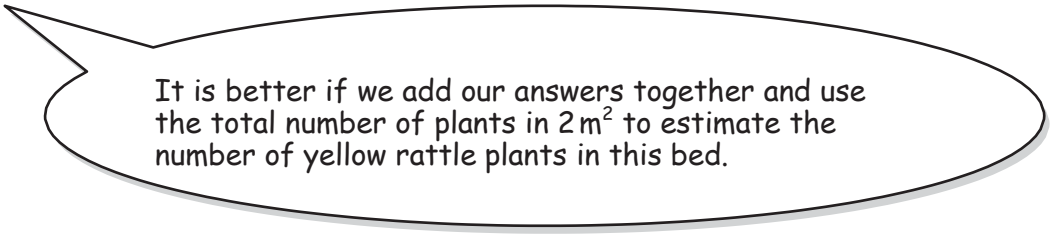
.....

(b) In one wildflower bed, Meera counted 60 yellow rattle plants and Joe counted 70.
They want to use these values to estimate the total number of yellow rattle plants in this bed.

Meera says,



Joe says,



(i) Who is correct?

Meera ☐ Joe ☑

Explain how you decide. [1]

Joes answer is the same as taking an average. He is using both these data to predict. This is more reliable method.

(ii) This wildflower bed has an area of 40 m².

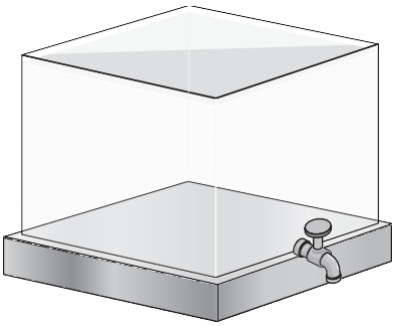
Use Joe's method to calculate an estimate of the number of yellow rattle plants in this bed. [2]

60 + 70 = 130 yellow rattle per 2m²

2 x 20 = 40

130 x 20 = 2600 yellow rattle

5. Use: 1 litre = 1000 cm^3



A water tank has a tap at the bottom.

The tank is a cuboid with length 110 cm, width 100 cm and height 80 cm.

When the tap is open, water flows from the tap at a constant rate of 20 litres per minute.

The tank is full and at 11:50 the tap is opened.

At what time will the tank be empty? [6]

Volume = 80 × 100 × 110 = 8000 × 110

= 8000 × 100 / 8000 × 10 = 800000 + 800000 = 880000 cm^3

880000 ÷ 1000 = 880 litres

880 ÷ 20 litres lost per minute = 44 minutes

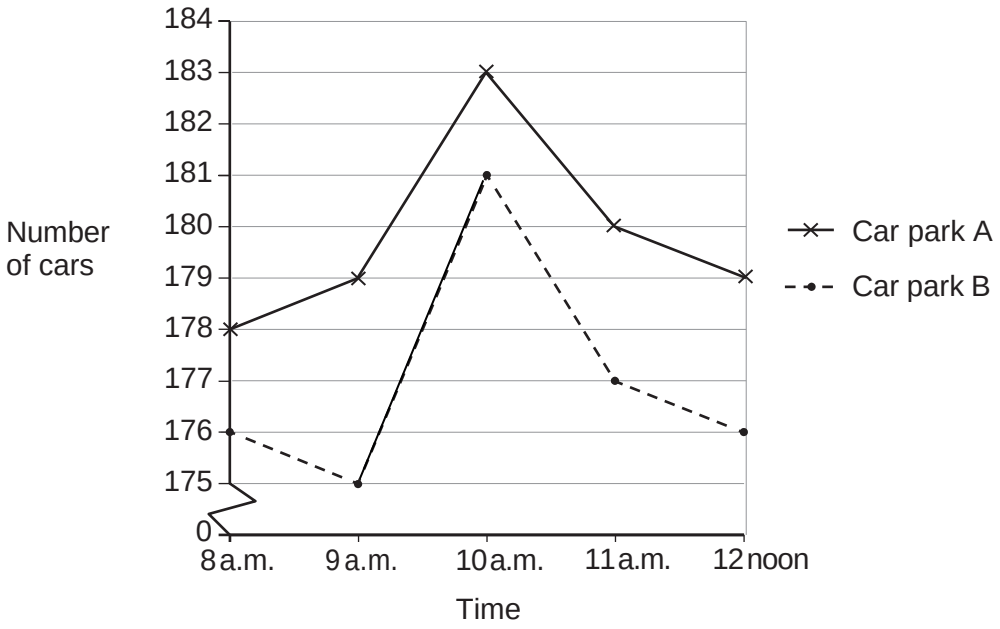
11:50 + 44 mins = 12:34 empty tank

6. 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	8 a.m.	9 a.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]

The graph doesn't include the numbers in between 0 – 175.

(b) What error might this lead to, for people who do not look carefully at the graph? [1]

They may count the number of cars in a wrong way eg starting from 0.

7. Lena makes a fruit drink by mixing orange juice, pineapple juice and sparkling water in the ratio

orange : pineapple : water = 3 : 2 : 7.

(a) What fraction of the mix is water? [1]

7/12

(b) Lena pours 300 ml of her fruit drink into a glass.

How much pineapple juice is in Lena's glass? [2]

1/6 × 300 = 50ml

50 ml

8.

Use:

$$\text{Pressure} = \frac{\text{Force (N)}}{\text{Area (cm}^2\text{)}}$$

A camera is attached to a tripod.
The tripod has 3 legs and stands on horizontal ground.
Each leg exerts the same pressure on the ground.

The tripod has a weight of 34 N.
The camera has a weight of 20 N.

Each foot of the tripod is a rectangle with length 3 cm and width 2 cm.

Work out the pressure exerted by the tripod and camera on the ground.
You must show all your working. [5]

Total force = 34 + 20 = 54N

Total area = 3 × (3 × 2) = 18cm²

pressure = 54/18 = 3N/cm²

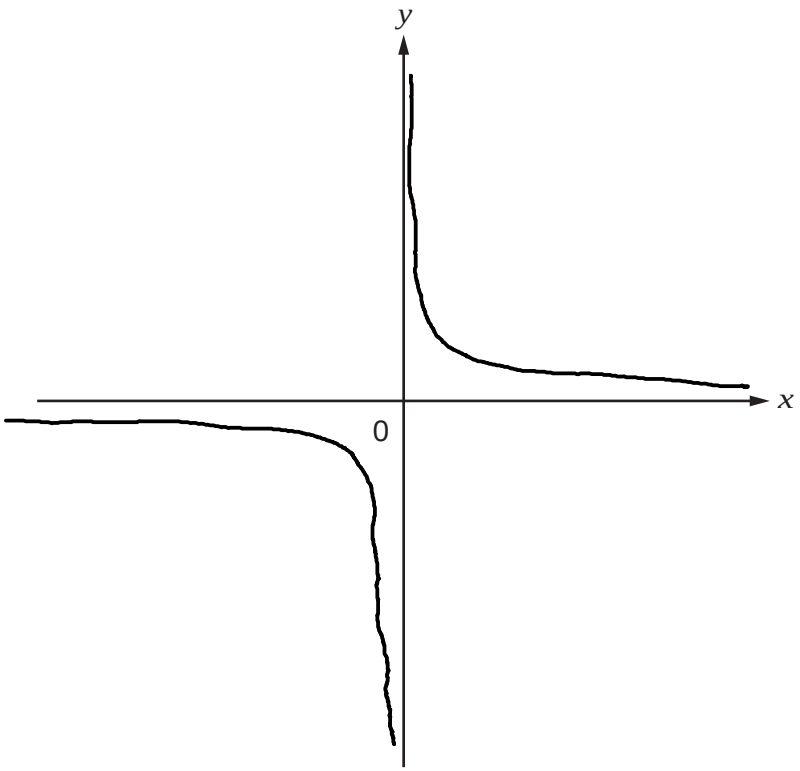
Pressure = 3 N/cm²

9. *(a)* (i) $xy = 1$

Explain why neither x nor y can be zero. [1]

Zero multiplied by anything is zero and so the answer will never be one in that case.

(ii) On the axes below, sketch the graph of $y = \frac{1}{x}$. [2]



(iii) Complete this sentence about the graph you have drawn. [1]

The graph shows 'y is inversely proportional to x'.

(b) The variables V and p are connected by the equation $\frac{V}{p^2} = 5$.

Find the value of V when $p = 0{\cdot}1$. [2]

$\frac{V}{(0.1)^2} = 5 \rightarrow V = 5 \times (0.1)^2$

$V = 0.05$