GCSE MATHEMATICS

S21-C300

Non-Calculator Assessment Resource E

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. *(a)* Work out each of the following.

(i) 541 + 59 [1]

$540 + 50 = 590$

$590 + 9 = 599$

(ii) 350 ÷ 5 [1]

$300 \div 5 = 60$

$50 \div 5 = 10$

$60 + 10 = 70$

(iii) 1·076 – 0·15 [2]

$1.076 - 0.150 \rightarrow 1.026 - 0.100$

$= 0.926$

(b) 526 × 7·9 = 4155·4

Use this information to work out 526 × 79 [1]

× 10 50 4155.4 = 41554

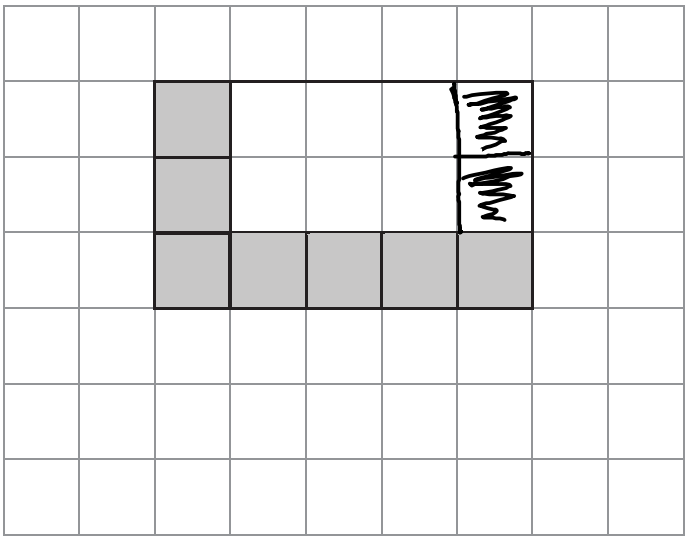
(c) Using numbers and symbols Anil correctly writes

minus one is greater than minus two.

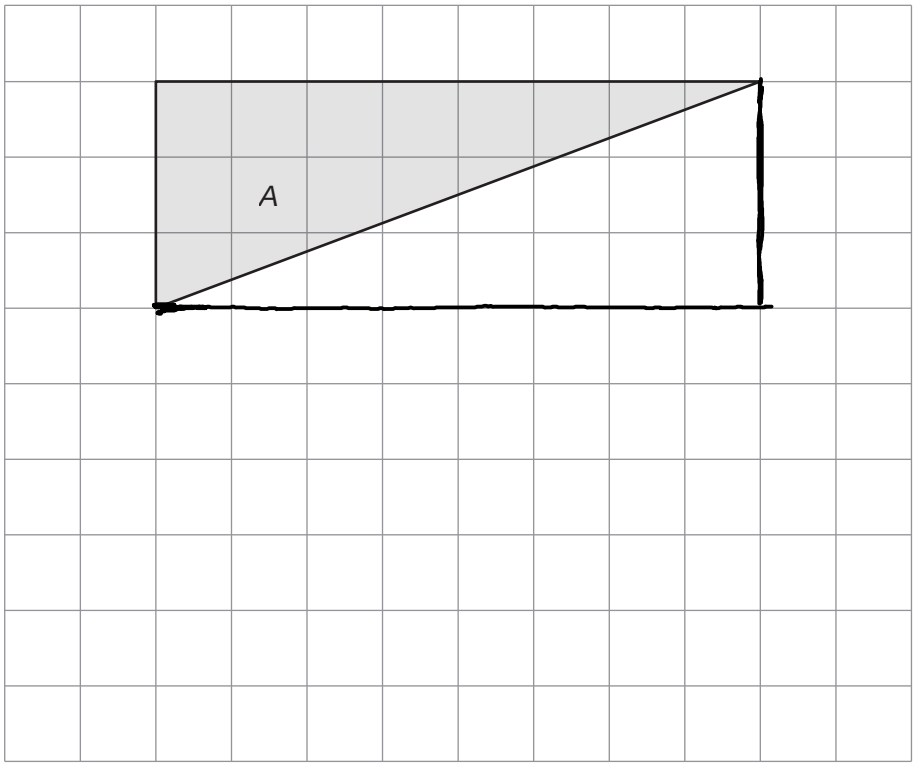
Circle what Anil writes.

–1 ≤ –2 –1 ≥ 2 –1 > –2 –1 < –2 –1 = –2 [1]

2. *(a)* Shade **two** more squares so that this shape has rotational symmetry of order 2. [1]



(b) On the grid below, draw a triangle that is congruent to triangle *A*. [1]



3. *(a)* The table shows the number of road closures in Hayshire during 6 months of 2018.

March	April	May	June	July	August
14	15	22	21	12	18

For these six months, calculate each of the following.

(i) The range of the number of road closures. [1]

$22 - 14 = 8$

Range ..... 8 .....

(ii) The mean number of road closures per month. [3]

$14 + 15 + 22 + 21 + 12 + 18 = 102$

$\frac{102}{6} = 17$

Mean ..... 17 .....

(b) The table shows the populations of some places in Hayshire at the end of 2018.

Place	Population
Tanham	12212
Copley	4658
Pinestow	619
Elmvale	3600

(i) Write the populations in order of size.
Start with the smallest. [1]

Pinestow , Elmvale , Copley , Tanham
Smallest

(ii) The population of Elmvale is predicted to be 4700 by the end of 2019.

To work out the number of houses to build for the extra people, the builders use the rule:

Build one house for every 4 extra people.

How many houses should they build? [3]

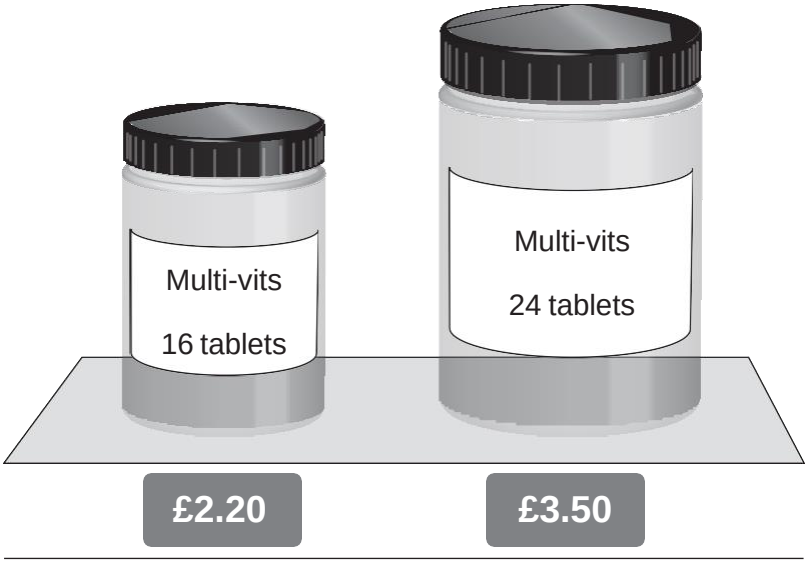
4700 − 3600 = 1100 extra people

1100 ÷ 4 = 275 new houses

275 houses

4. A health food shop sells food supplements.

(a) Vitamin tablets are sold in two different size bottles.



Which bottle is better value for money?

16 tablets ☑ 24 tablets ☐

Show how you decide. [2]

16 tablets → $\frac{2.20}{4}$ = 4 tablets = €0.55
12 tablets = €1.65

24 tablets → $\frac{3.56}{2}$ = 12 tablets = €1.75

for 12 tablets easy comparison the big bottle is more expensive.

(b) Calcium tablets are sold in small boxes measuring 8 cm by 3 cm by 5 cm.

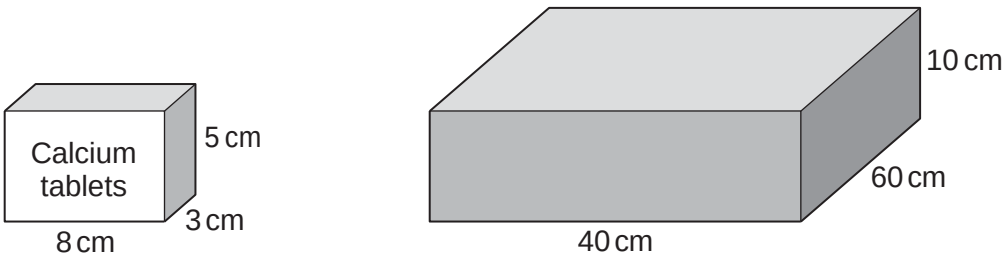


Diagram not drawn to scale

The supplier packs the small boxes into large boxes measuring 40 cm by 60 cm by 10 cm. There are no gaps in the large box when it is full.

The health food shop orders a full large box containing a total of 3600 calcium tablets.

How many tablets are there in one **small** box? [4]

large vol $= 60 \times 10 \times 40 = 24000\ cm^3$

Small vol $= 5 \times 8 \times 3 = 120\ cm^3$

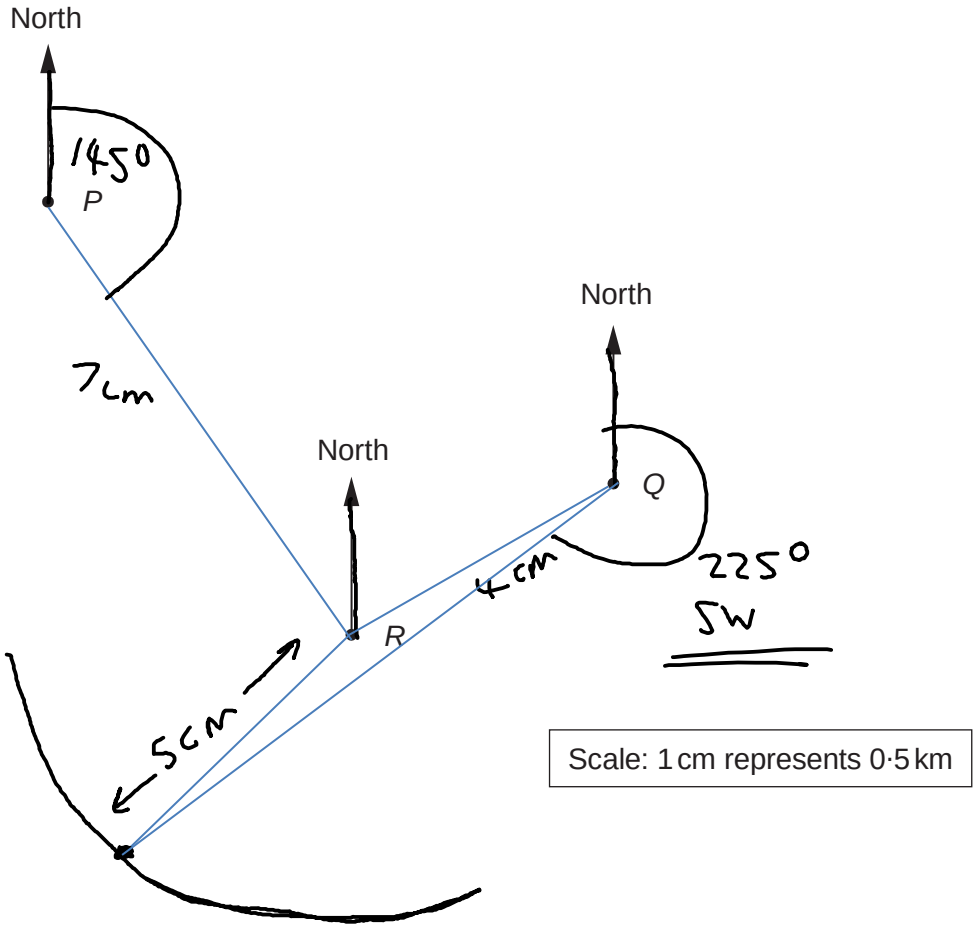
$\frac{24000}{120} = 200$ small boxes in large box

200 small boxes $= 3600$ tablets

$3600/200 = 18$ tablets in each small box

18 tablets in one small box

5. The diagram shows the position of two aeroplanes, *P* and *Q*.
There is a radar station at *R*.
The scale is 1 cm represents 0.5 km.



(a) *R* is nearer to *Q* than it is to *P*.

How much nearer? [2]

7cm − 4cm = 3cm = 1.5km

1.5 km

(b) Measure and write down the bearing of *R* from *P*. [1]

3.5 km at a bearing of 145°

(c) There is an airport which is 2·5 km from *R* and to the south-west of *Q*.

Mark the position of the airport with a cross on the diagram. [2]

6. The organiser of a teachers' conference provided a buffet lunch made by a catering service.

(a) The catering service made a total of 560 cups of tea and coffee.
These were served in the ratio 5 : 3 respectively.
The catering service billed the conference organiser £1 for each cup of tea and £1.50 for each cup of coffee served.
How much was the total bill for the tea and coffee? [4]

Tea : Coffee
5 : 3 = 8
560/8 = 70
70×5 : 70×3
350 : 210
350 tea × £1 = £350
210 coffee × £1.50 = £210 + £105 = £315
£350 + £315 = £665

Total bill for tea and coffee £ 665

(b) The buffet food was placed on 3 large tables, one for meat, one for vegetarian and one for vegan dishes.
Teachers chose their food from one of these tables.

The numbers of teachers per minute who chose food from the table of meat dishes and the table of vegetarian dishes is shown below.

Table	*Meat*	*Vegetarian*	*Vegan*
Number of teachers per minute	8	4	7

After 5 minutes, 95 teachers had chosen their food.

How many teachers per minute chose their food from the table of vegan dishes?
You may assume that the teachers chose their food at a constant rate. [3]

$95 \div 5 = 19$ per minute

$19 - (8+4) =$ vegan $= 7$

7 teachers per minute

7. The diagram shows a cylinder.

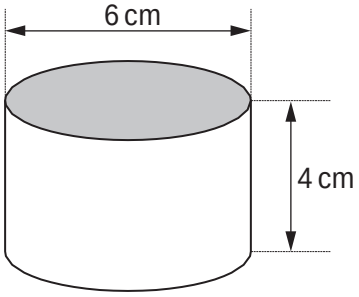
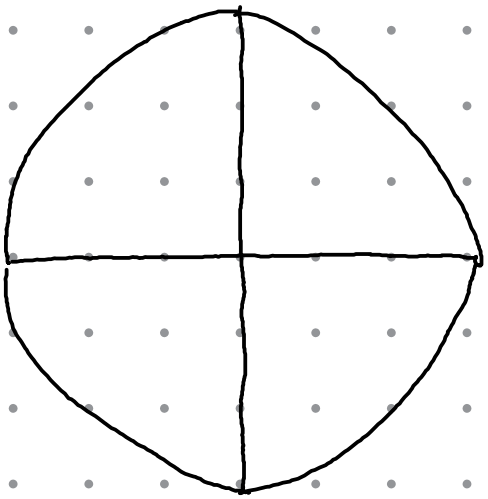


Diagram not drawn to scale

On the 1 centimetre grid below, draw accurately:

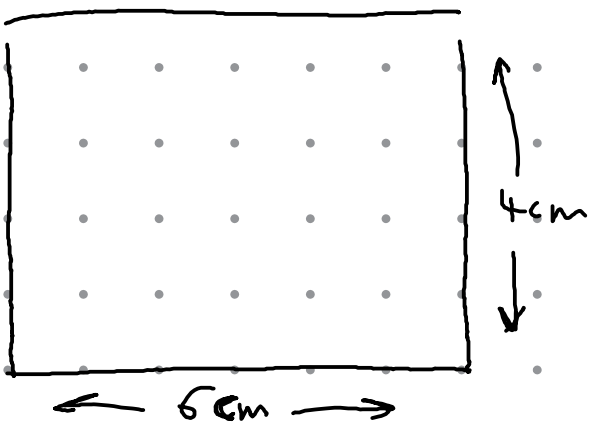
- the plan of the cylinder,
- the side elevation of the cylinder. [3]

Plan



Use compass set at 6 cm.

Side elevation



8.

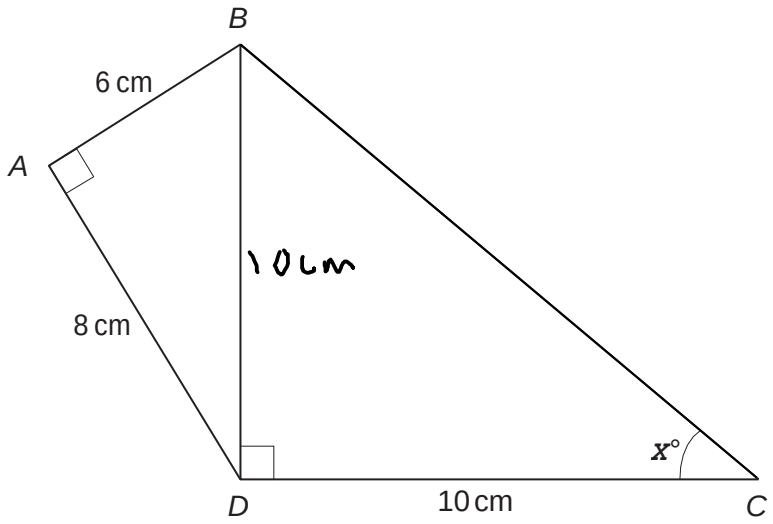


Diagram not drawn to scale

Find the value of x.
You must show all your working. [3]

$6^2 + 8^2 = c^2$ $\quad c^2 = 100$

$36 + 64 = c^2$ $\quad c = 10\text{cm} = BD$

$\tan x = 10/10 = 1$

$x = 45^\circ$

$x =$ 45°