GCSE MATHEMATICS

S21-C300

Non-Calculator Assessment Resource G

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)* (i) Work out 30 × 20. [1]

30 x 20 → 300 x 2 = 600

(ii) Work out 96 ÷ 4. [1]

$\frac{96}{4} = 24$

(b) Write 3% as a decimal. [1]

3/100 = 0.03

(c)

$\frac{3}{20}$	0·35	−0·3	$\frac{1}{4}$	0·031

Use a value from the box to complete the following statement. [2]

$\frac{3}{10}$ is less than 0.35

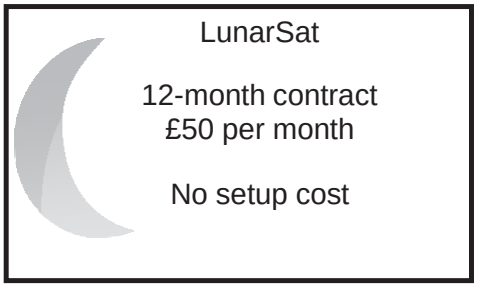
3/10 = 0.3

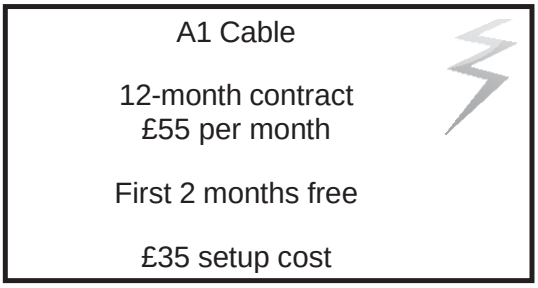
0.3 < 0.35

(d) Work out $\frac{5}{12}$ of 24. [2]

$\frac{24}{12} = 2 \rightarrow 2 \times 5 = 10$

2. Adesh wanted a 12-month internet and TV contract.
He chose the cheaper of these two deals.





Which deal did Adesh choose and how much cheaper was it? [5]
You must show all your working.

Lunar → 50 × 12 = £600

A1 → 55 × 10 = €550

€550 + €35 = €585

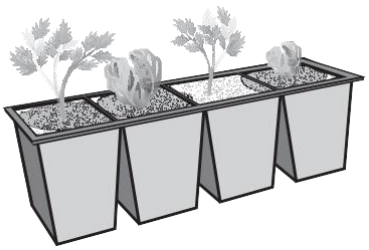
€600 − €585 = £15

Adesh chose A1 Cable

which was £ 15 cheaper.

3. Chris and Sue are buying some items for their vegetable garden.

(a)



Vegetable Plants

£1.99 for a single strip

OR

£7.50 for a box of 5 strips

Chris buys a box of vegetable plants.

How much money does he save compared to buying 5 single strips? [3]

$5 \times 1.99 = 10 - 0.05 = £9.95$

$£9.95 - £7.50 = £2.45$ saved

(b) Sue buys 20 bags of compost costing £6.99 each and some packets of seed costing £2.89 each.

She correctly **estimates** her bill to be £170.

How many packets of seed did she buy? [3]

$20 \times 7 = £140$ compost

$£170 - £140 = £30$ on seeds

$£30 / £3 = 10$ bags seeds

4. An art shop gives away a free copy of a photograph with purchases over £10.




The table shows the probability that each photograph, chosen at random, is given away.

Photograph	Flower	Mountain	Water	City
Probability	0·32	0·28	0·25	0·15

(a) Copies of these 4 photographs are the only photographs given away by the art shop in this offer.
Explain how you know this. [1]

0.32 + 0.28 + 0.25 + 0.15 = 1.00

The total of probabilities is 1 so no other photographs are given away by the art shop.

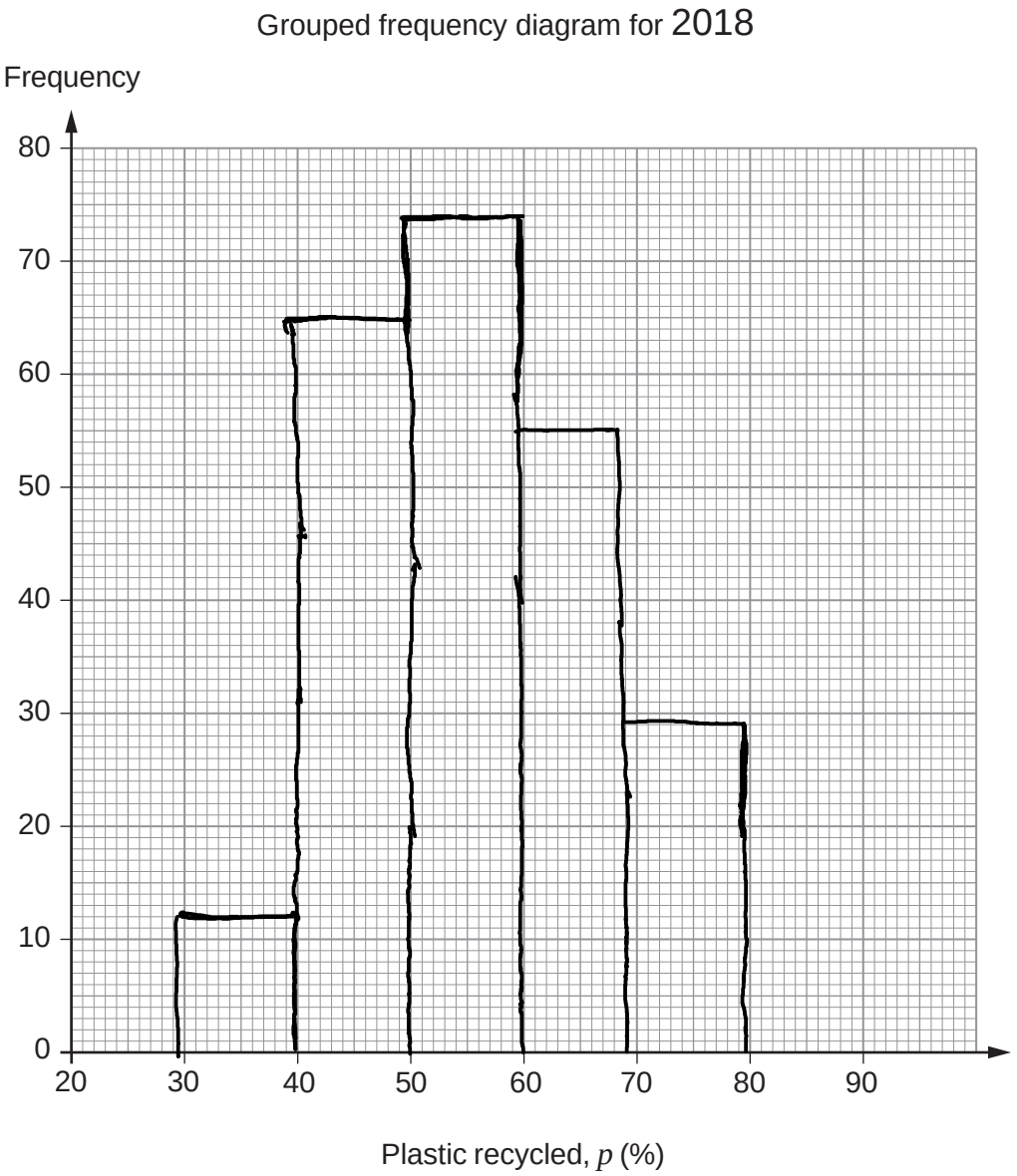
(b) Work out the probability that the photograph given away by the art shop is of the Water or City. [1]

0.25 + 0.15 = 0.4 0.4 = 2/5

5. The grouped frequency table shows information about the percentage of plastic packaging that each of the 235 members of an eco-group recycled in 2018.

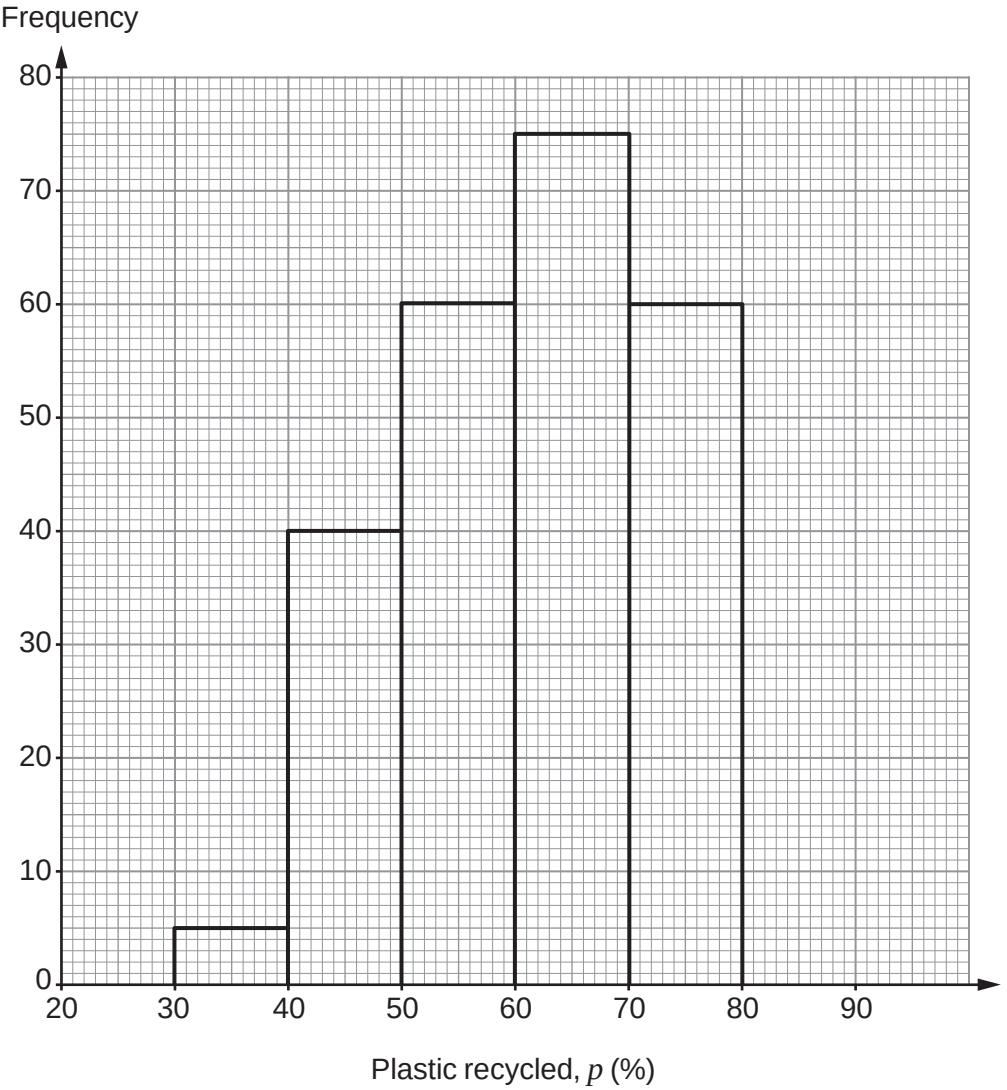
Plastic recycled, p (%)	Frequency
$30 \leq p < 40$	12
$40 \leq p < 50$	65
$50 \leq p < 60$	74
$60 \leq p < 70$	55
$70 \leq p < 80$	29

(a) On the graph paper below, draw a grouped frequency diagram to show this data. [2]



(b) In 2019, the eco-group had more members.
They recorded the percentage of plastic packaging that they each recycled for that year.
The grouped frequency diagram of the results is shown below.

Grouped frequency diagram for 2019



What is the probability that a member of the eco-group recycled at least 70% of their plastic packaging in 2019? [2]

70% and above = 60 60/240 = 1/4

(c) Use the information provided to write a statement **comparing** the percentage of plastic recycled in these two years. [1]

both years percentages ranged from $30 \leq p \leq 90$
Both had percentage range of 60.1.

6. When a fraction is subtracted from $\frac{5}{7}$ the answer is $\frac{2}{21}$.

Find the fraction that is subtracted. [3]

$5/7 - x = \frac{2}{21}$

$15/21 - x = 2/21 \rightarrow x = 13/21$

7. *(a)* Simplify $18\pi \div 9\pi$. [1]

$\frac{18\pi}{9\pi} = \frac{18}{9} = 2$

(b) The diagram shows two circles, one inside the other.

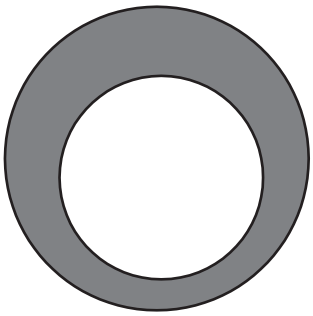


Diagram not drawn to scale

The radius of the outer circle is 6 cm.
The radius of the inner circle is 5 cm.

Work out the area of the shaded region.
Give your answer in terms of π. [3]

Big circle area − small circle area

Big circle → $\pi(6)^2 = 36\pi \text{ cm}^2$

Small circle → $\pi(5)^2 = 25\pi \text{ cm}^2$

$36\pi - 25\pi = 11\pi \text{ cm}^2$

Area of shaded region = 11π cm^2

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

He has:

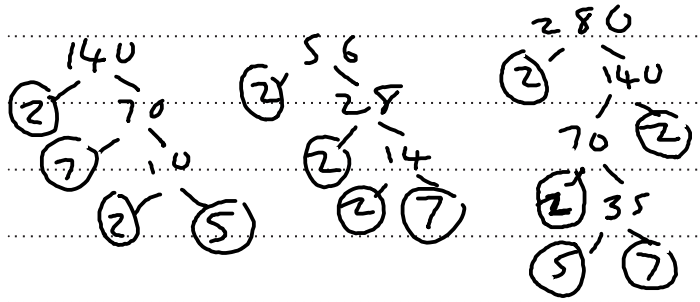
- 140 discount vouchers,
- 56 pencils,
- 280 sweets

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 each bag contain? [5]

Find HCF first



$2 \times 2 \times 7 = 4 \times 7 = 28$

$140 \div 28 = 5$ vouchers per bag

$280 \div 28 = 10$ sweets per bag

$56 \div 28 = 2$ pencils per bag

Ivan makes 28 bags containing

5 vouchers, 2 pencils, 10 sweets.

9. *(a)* Simplify $14\sqrt{5} - 3\sqrt{5}$. [1]

$14\sqrt{5} - 3\sqrt{5} = 11\sqrt{5}$

(b) Work out the value of $4^{10} \times 4^{-7}$. [2]

$4^{10} \times 4^{-7} \rightarrow 4^{10-7} \rightarrow 4^3 = 64$