GCSE MATHEMATICS

S21-C300

With Calculator Assessment Resource I

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:

$$v = u + at$$

$$s = ut + 1/2\ at^2$$

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

1.

18	29	94	108	162	343

From the numbers in the list above, write down:

(a) a multiple of 4 [1]

108

(b) a prime number [1]

29

(c) the square root of 324 [1]

18

(d) a cube number. [1]

343

2. *(a)*

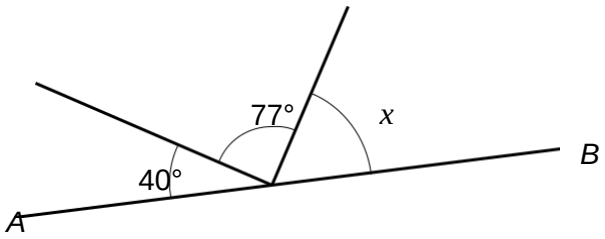


Diagram not drawn to scale

AB is a straight line.

Calculate the size of angle *x*. [2]

$180 - (40 + 77) = 63^\circ$

$x =$ 63 °

(b)

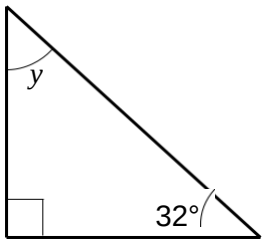


Diagram not drawn to scale

Calculate the size of angle *y*. [2]

$180 - (32 + 90) = 58$

$y =$ 58 °

3. A set of raffle tickets numbered 1 to 500 are all sold at a charity event. A ticket, picked at random, wins the only prize.

(a) What is the probability that the number on the winning ticket is 20? [1]

1/500

(b) What is the probability that the number on the winning ticket is greater than 200? [1]

300/500 = 3/5

(c) Ben has bought 8 of the tickets. He says,

"I have a 50% chance of winning because either I win or I don't win."

Is Ben correct?

Yes ☐ No ☑

Explain your answer. [1]

He has 8/500 chance of winning

For a 50% chance he needs to have 250 tickets.

(d) The probability that Zac wins the prize is 0.01.

(i) What is the probability that Zac does **not** win the prize? [1]

1 − 0.01 = 0.99

(ii) How many raffle tickets does Zac have? [2]

0.01 = 1% chance

1/100 × 500 = 5 tickets

4. *(a)* Two taxi drivers record the number of miles they each drive on 12 days.
The results are shown in the table below.

Miles driven								
Barry					Samira			
160	171	171	175		161	172	174	174
177	182	188	189		180	181	185	186
190	191	193	208		192	192	196	203

(i) Use the data to complete this table. [2]

	Barry	Samira
Range	48	42
Median	185	183

(ii) Which taxi driver drove a more consistent number of miles each day?
Give a reason for your answer. [1]

Samira as her range is smaller

(b) Tanya is also a taxi driver.
Last month she drove 3405

miles. She says,

"That means that I drive over 40 000 miles in a year!"

(i) Show how Tanya could be correct. [2]

3405 × 12 = 40860 miles

(ii) State **one** assumption Tanya has made.
Explain how this has affected the answer. [2]

Assumption: Every month is the same length

Explanation: There are months with 29, 30, 31 days so she will do a diffrent amount in some months. She has not teken that into account.

5.

Use: 1 mile = 1·6 km

(a) The Earth travels around the Sun at 30 km per second.

Convert 30 km per second into miles per second. [2]

30 / 1.6 = 18.75 miles per second.

(b) (i) The diagram shows a field. It has an area of 1 square mile.

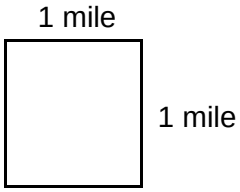


Diagram not drawn to scale

What is the area of the field in square kilometres? [2]

$1.6 \times 1.6 = 2.56 \text{ km}^2$

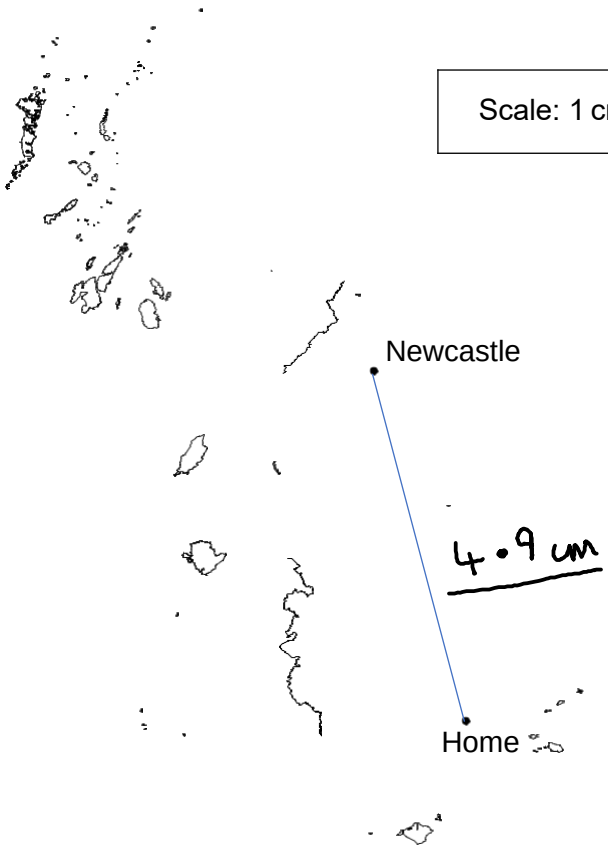
(ii) The surface area of the Earth is about two hundred million square miles.

Calculate the surface area of the Earth in square kilometres. [2]

$(1.6)^2 = 2.56$

$2.56 \times 200,000,000 = 512\,000\,000$

6. Nadia is going to drive from her home to a meeting in Newcastle.



Her route can be approximated using a straight line.
She plans to leave home at 6 a.m.
She wants to arrive in Newcastle at 11:45 a.m.
What must Nadia's average speed be for her to get to Newcastle on time?
Give your answer in miles per hour. [5]

4.9 × 50 = 245 miles distance

6 am → 11:45 am = 5 hours and 3/4 = 5.75

speed = distance/time → 245/5.75 = 42.60869565

= 42.6 mph

7. Rashid plays a game.
Each time he can score 1 point, 5 points or 10 points.
The table shows the probability of each outcome.

Points	Probability
1	0·80
5	0·15
10	0.05

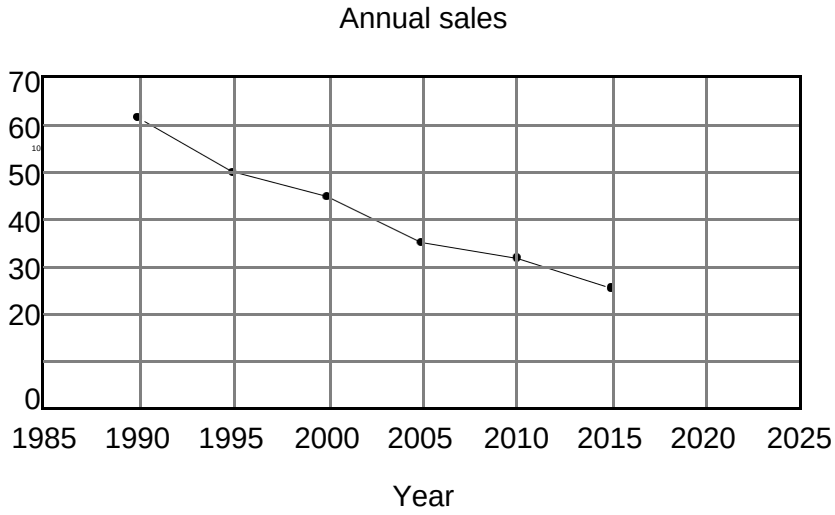
Rashid plays the game 40 times.

How many times does he expect to score more than 1 point? [3]

0.15 + 0.05 = 0.2

0.2 × 40 = 8

8. The graph shows the number of copies of a local newspaper sold over a 25-year period.



(a) (i) Eva uses the graph to predict that about 10 thousand newspapers will be sold in 2025.

Explain why her prediction may not be reliable. [1]

Extrapolation of data. There isn't enough data near this time to make this claim.

(ii) Between 1990 and 2015, sales of the local newspaper fell from 62 000 to 26 000.

What was the percentage decrease in sales? [2]

$\frac{26000}{62000} = 13/31$

$(1 - 13/31) \times 100 = 58.1\%$

(b) The ratio of adults who read news online to those who do not is 16:9.
The adult population of the UK is about 52 000 000.

Calculate an estimate of the number of adults in the UK who read news online. [2]

$16 + 9 = 25$ $16 \times \frac{52000000}{25} = 33280000$