GCSE MATHEMATICS

S21-C300

Non-Calculator Assessment Assessment B

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:

$$v = u + at$$

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

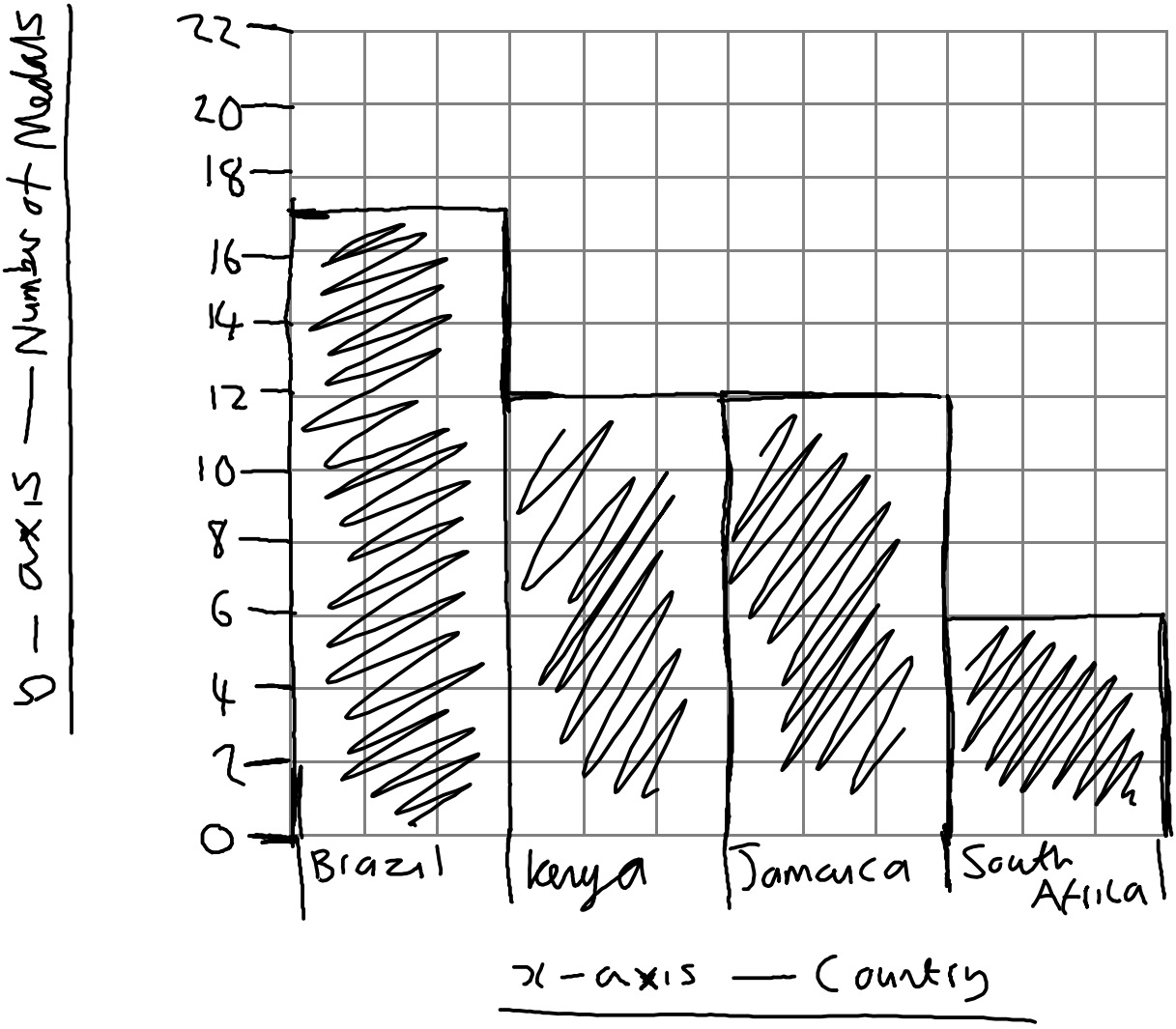
$$v^2 = u^2 + 2as$$

1. *(a)* (i) This table shows the total number of medals won by four countries in the 2012 London Olympic Games.

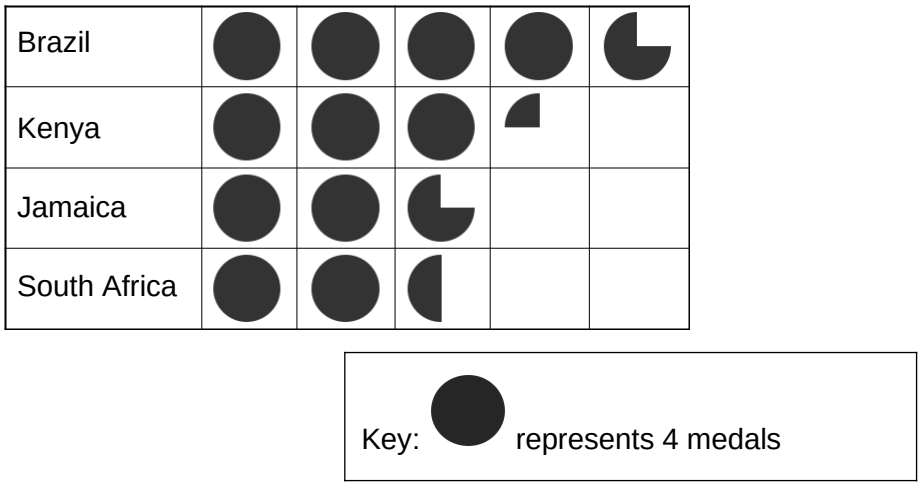
Country	Number of medals
Brazil	17
Kenya	12
Jamaica	12
South Africa	6

Draw a bar chart to show this information. [3]

2012 Olympic Medals Won



(ii) The pictogram shows the total number of medals won by the same four countries in the 2016 Rio Olympic Games.



Use the information given in the table and pictogram to complete the sentences below:

The total number of medals won by Brazil in 2016 is ……2…… more than they won in 2012.

The total number of medals won by ……South Africa…… in 2016 is 4 more than they won in 2012. [2]

(b) In 2016, the total of gold, silver and bronze medals won by China was 70. They won:

- 18 silver medals,
- the same number of gold medals as they did bronze medals.

How many gold medals did China win? [2]

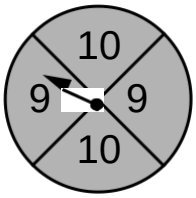
70 − 18 = 52

52/2 = 26 each gold and bronze

……26…… gold medals

.

6



The diagram shows a fair 8-sided dice, numbered from 1 to 8, and a fair spinner.

Jamie rolls the dice and spins the spinner.
He then multiplies the two scores.

(a) Complete the diagram to show all Jamie's possible outcomes.

Spinner								
	10	10	20	30	40	50	60	70	80
	9	9	18	27	36	45	54	63	72
	×	1	2	3	4	5	6	7	8

Dice

[1]

(b) Find the probability that Jamie's outcome is an even number greater than 50. [2]

There are 6 numbers over 50 but only 5 are even.

5/18

3. *(a)* Simplify

(i) $2a - b + 5a - 3b$, [2]

$2a + 5a = 7a \rightarrow 7a - 4b$

$-b - 3b = -4b$

(ii) $1 + 4 \times c \times c$. [1]

$4c^2 + 1$

(b) (i) This formula converts a UK shoe size to a Japanese shoe size.

Japanese size = UK size + 19

Yuto wears a Japanese size $29\dot{5}$.

What would Yuto's shoe size be in the UK? [1]

$29.5 - 19 = \text{UK size} = 10.5$

(ii) This table shows the equivalent shoe sizes used in the UK and the USA.

UK size	5	6	7	8	9
USA size	6	7	8	9	10

Complete this formula connecting the UK size and the USA size. [1]

UK size = ……

USA size − 1

4. Twelve members of a running club take part in three runs.

(a) The table shows the times taken, in hours, by the 12 runners to complete the first run.

1·2	0·9	2·5	1·3	2·1	2·6
1·8	2·0	2·1	2·1	1·5	2·2

(i) Find the mode of the times. [1]

2.1

(ii) Find the range of the times. [1]

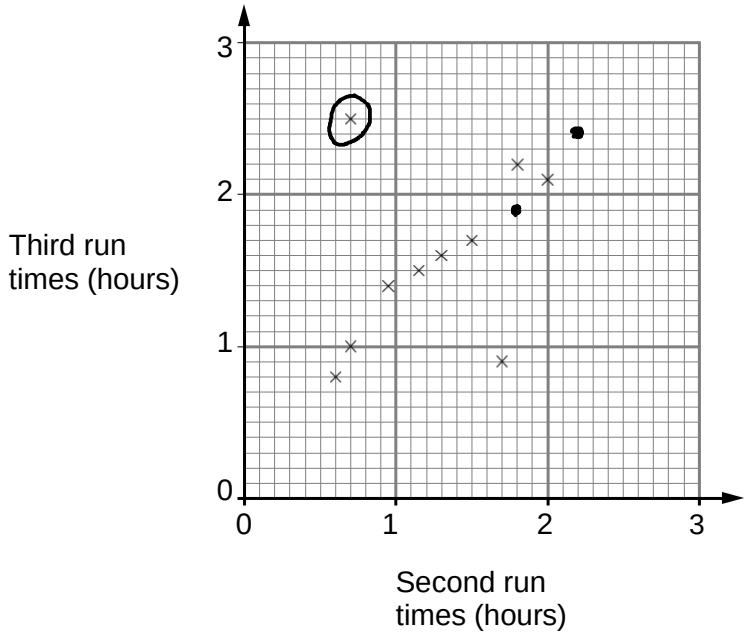
2.6 − 0.9 = 1.7

(iii) A runner was chosen at random from those who took part in the first run.

Find the probability that this runner took at most 1·5 hours. [1]

4/12 = 1/3

(b) The scatter diagram shows the times it took 10 of the runners to complete the other two runs.



(i) One of these 10 runners was injured during the third run and walked most of the way.

Circle the plot most likely to represent this runner on the scatter diagram. [1]

(ii) The times, in hours, taken by the remaining 2 runners were:

	Runner 11	Runner 12
Second run	1·8	2·2
Third run	1·9	2·4

Plot these times on the scatter diagram. [2]

(iii) Using the information on the completed scatter diagram, what was the difference between the fastest time for the second run and the fastest time for the third run? Give your answer in minutes. [3]

$0.8 - 0.6 = 0.2$ hours

$= 20 \times 60 = 12$ mins

Time difference = 12 minutes

5. *(a)* Solve $19 - 4x = 11$. [2]

$19 - 4x = 11 \rightarrow -4x = -8$

$x = 2$

(b) Solve $\frac{2x - 3}{4} = 3x$. [3]

$\frac{2x-3}{4} = 3x \rightarrow 2x - 3 = 12x$

$-3 = 10x$

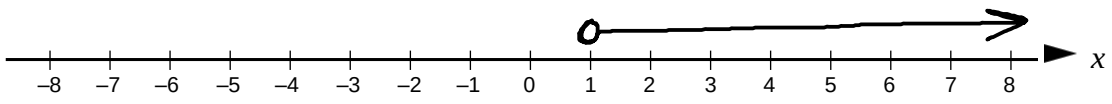
$x = -3/10$

(c) (i) Solve $3x + 2 > 5$. [2]

$3x + 2 > 5 \rightarrow 3x > 3$

$x > 1$

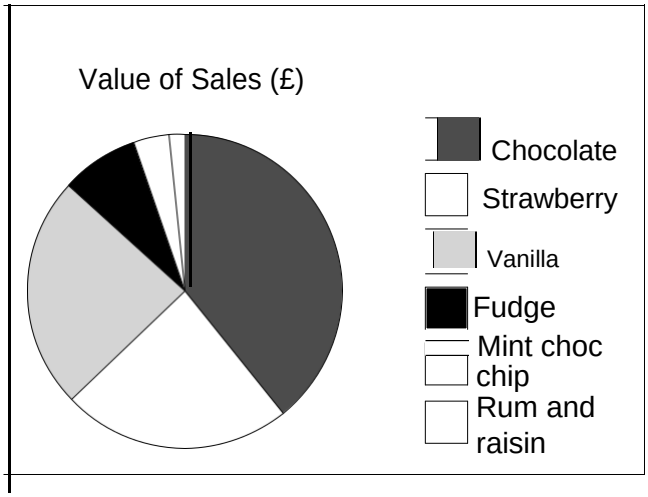
(ii) Represent your answer to part *(c)*(i) on the number line below. [1]



6. Cherie is in charge of marketing for a tourist attraction.

(a) One weekend, she collects some data about the value of ice cream sales from the café. She records her data in a table and uses it to draw a pie chart.

Ice cream flavour	Value of sales (£)
Chocolate	500
Strawberry	300
Coffee	0
Vanilla	300
Fudge	100
Green tea	0
Mint choc chip	50
Rum and raisin	20



State one criticism of the use of a pie chart to display her data. [1]

You cant tell which ice creams chchet sell at all.

(b) Cherie also records the number of visitors to the tourist attraction each season for 4 years.
Her results are shown in the table.

	Season	Winter	Spring	Summer	Autumn
Visitors (thousands)	2015	9	14	19	13
	2016	9	13	17	12
	2017	6	11	14	9
	2018	4	8	15	10

Comment on the trend in the **annual** number of visitors shown by the data in the table. [1]

Total numbr of visitors decreasing annually.

7. The table shows some of the values of $y = x^2 + x - 1$ for $-2 \leq x \leq 1$.

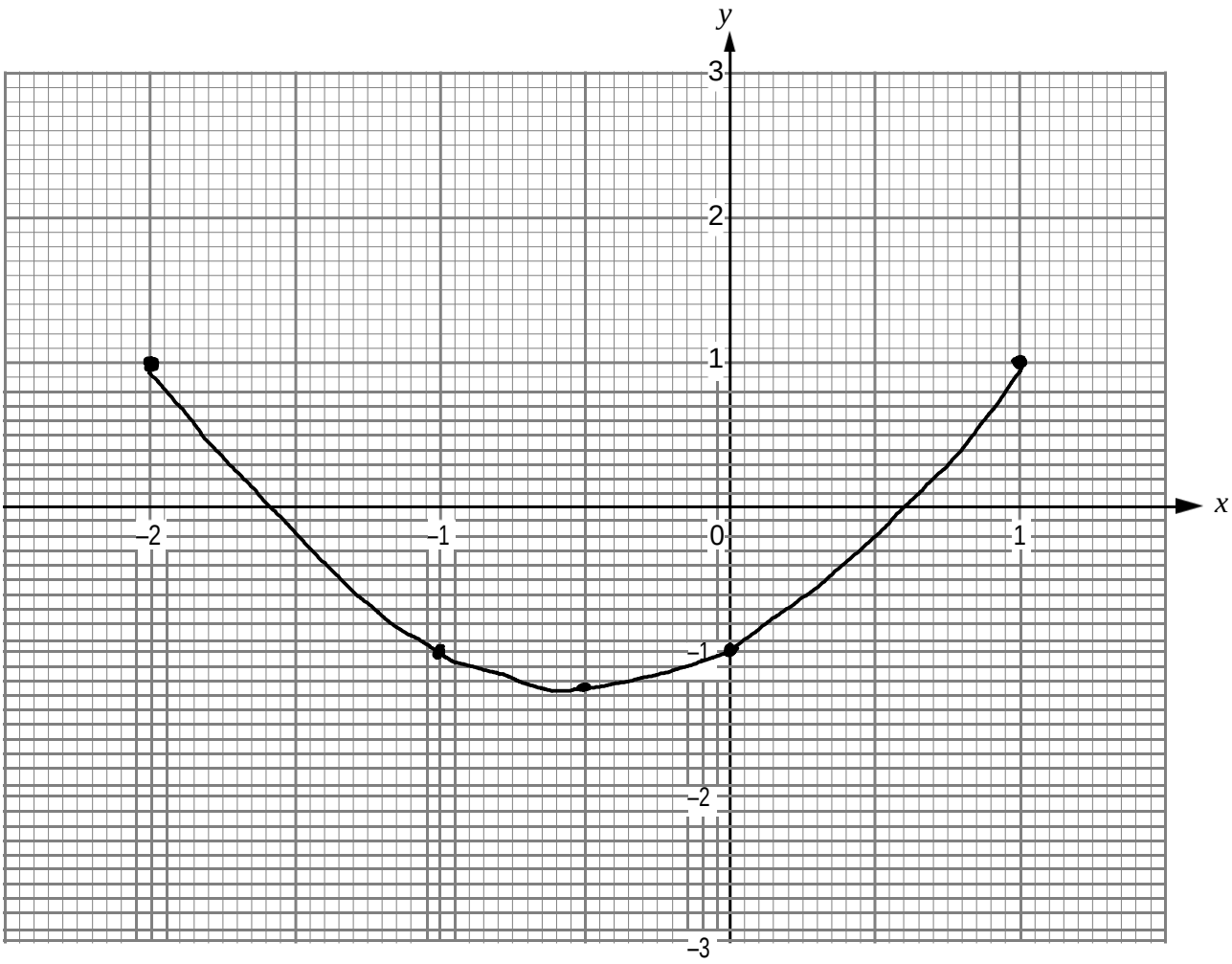
x	–2	–1	–0·5	0	1
$y = x^2 + x - 1$	1	–1	–1·25	–1	1

(a) Complete the table above. [2]

$(-2)^2 + (-2) - 1 \rightarrow 4 - 3 = 1$ $(0)^2 + (0) - 1 = -1$

$(1)^2 + (1) - 1 \rightarrow 1$

(b) On the graph paper below, draw the graph of $y = x^2 + x - 1$ for $-2 \leq x \leq 1$ [2]



(c) State the equation of the line of symmetry of the curve $y = x^2 + x - 1$. [1]

$x = -0.5$

(d) Use your graph to solve $x^2 + x - 1 = 0$. [2]

when $y = 0$ $x = 0.6$ and -1.6