Surname		Centre Number	Candidate Number
First name(s)			0

GCSE

C300U10-1

Z22-C300U10-1

Part of WJEC

FRIDAY, 20 MAY 2022 – MORNING

MATHEMATICS – Component 1
Non-Calculator Mathematics
FOUNDATION TIER

2 hours 15 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	7	
2.	3	
3.	5	
4.	3	
5.	3	
6.	4	
7.	6	
8.	5	
9.	4	
10.	3	
11.	5	
12.	8	
13.	3	
14.	7	
15.	2	
16.	5	
17.	6	
18.	6	
19.	3	
20.	2	
21.	7	
22.	6	
23.	5	
24.	3	
25.	6	
26.	3	
Total	**120**	

ADDITIONAL MATERIALS

An additional formulae sheet.

The use of a calculator is not permitted in this examination.

A ruler, protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

If you run out of space, use the additional page(s) at the back of the booklet, taking care to number the question(s) correctly.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the need for good English and orderly, clear presentation in your answers.

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:

$$\text{Curved surface area of a cone} = \pi rl$$

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

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

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

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) Calculate each of the following.

(i) 3×400 [1]

(ii) $600 \div 1000$ [1]

(iii) $10 + 4 \times 3$ [1]

(iv) $6 - (-7)$ [1]

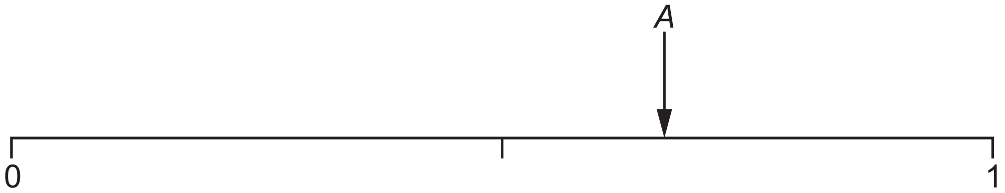
(b) (i) Write $\frac{11}{25}$ as a percentage. [1]

(ii) Write 87% as a decimal. [1]

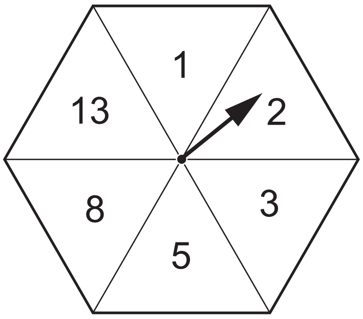
(c) Write down the value of $\sqrt{49}$. [1]

2. (a) Circle **one** term from the box that matches the probability shown by arrow *A* on this probability scale. [1]

impossible   unlikely   an even chance   likely   certain



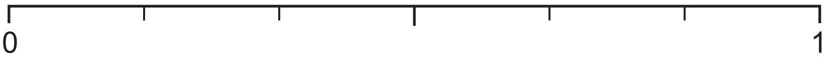
(b) The diagram shows a fair spinner.



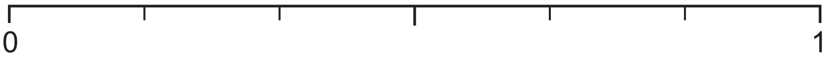
Carol spins the spinner once.

On the probability scale below, mark with an arrow the probability that Carol spins

(i) a number greater than 13, [1]



(ii) an even number. [1]



3. (a) Circle the smallest value. [1]

$\frac{1}{2}$ 0·35 0·315 $\frac{3}{4}$ 0·6

(b) Work out the value of the following.

$$80 + \left(25\% \text{ of } 48\right) - \left(\frac{2}{5} \text{ of } 45\right)$$

You must show all your working. [4]

Examiner only

4. Miss Watkins picks a team of one girl and one boy to take part in a competition.

She chooses the team from these students.

Girls:	Poppy (P)	Ruby (R)	Sally (S)	Zoe (Z)
Boys:	Tariq (T)	Will (W)		

(a) Complete the list to show all the different options that Miss Watkins has.
The first two have been completed for you. [2]

Girl	Boy
P	T
P	W

You may not need all the lines.

(b) Miss Watkins is equally likely to choose any of the possible options.

What is the probability that she chooses Sally and Tariq? [1]

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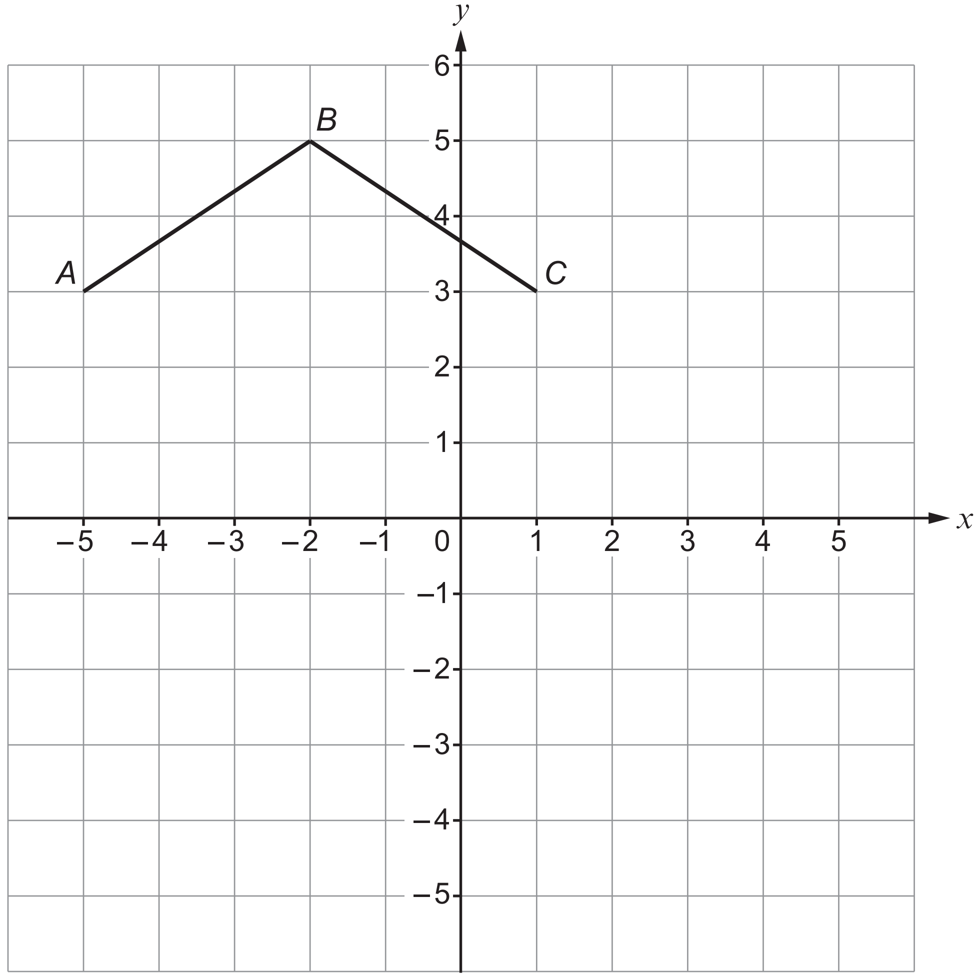
5.



The diagram shows part of a kite, *ABCD*.
It is drawn on a 1 cm square grid.

(a) Write down the coordinates of the point *B*. [1]

(....................... , ...)

(b) *ABCD* has one line of symmetry.
The length of *BD* is 6 cm.

Mark the position of point *D* on the grid and measure the length of *CD*. [2]

Length of *CD* = ... cm

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6.

A grill is large enough to cook 20 kebabs.
The following formula is used to calculate the amount of time, in minutes, it takes to prepare and cook kebabs on this grill.

$$\text{Time} = 2{\cdot}5 \times \text{Number of kebabs} + 16$$

(a) How long does it take to prepare and cook 10 kebabs? [2]

(b) How many kebabs can be prepared and cooked in 26 minutes? [2]

7. (a) In 2019, the cost of a train journey was £300.
In 1979, the cost of the same train journey was 8% of the cost in 2019.

How much did the journey cost in 1979? [2]

(b)

Saver Railcard

adult ticket: $\frac{1}{3}$ off *

child ticket: 60% off *

**discount off normal ticket price only*

Bob has a *Saver Railcard*.
He takes his 7-year-old grandson on a journey by train.

For this journey, the normal price of
- an adult ticket is £15,
- a child ticket is £8.

How much does Bob **save** in total when buying the two tickets using his railcard? [4]

Total saving £ ....

8. Rosheen works in a restaurant.

(a) On a weekday, her pay rate is £9 per hour.
One Monday, Rosheen worked for 6·5 hours.

How much did Rosheen earn for this day's work? [2]

(b) At the weekend, Rosheen's pay rate is higher.

One weekend, she worked for 14 hours.
She earned a total of £314 which included £160 in tips.

What is Rosheen's pay rate per hour at the weekend? [3]

9. Tomas sells small boxes of 6 eggs or large boxes of 10 eggs.

He sells x small boxes.
He sells 8 more of the large boxes than the small boxes.

(a) Write an expression, in terms of x, for the number of large boxes he sells. [1]

(b) Write an expression, in terms of x, for the total number of **eggs** he sells.
Give your answer in its simplest form. [3]

10. Work out the value of $\frac{2^3}{6^2}$.

Give your answer as a fraction in its simplest form. [3]

11. (a) There are five children in the Cooke family.
Two of the children are the same age, the other children are different ages.

The range of their ages is 5 years.
The mode of their ages is 14 years.
The youngest child is 12 years old.

Find one possible solution for the ages of the other four children. [2]

The ages could be 12, ... , ... , ... , ...

(b) Mr Cooke takes his children out for lunch.
The list below shows the food they order.

1 Mega Burger	£8.99
1 Vegan Burger	£7.25
1 Chicken Burger	£8.99
1 Regular Burger	£6.30
1 Fish Pie	£9.90
1 Vegetarian Lasagne	£6.80

When he pays the bill, Mr Cooke uses this special offer.

Buy any 4 **burgers** and get the 2 cheapest free

Estimate the total amount of Mr Cooke's bill.
Give your answer correct to the nearest pound.
You must show all your working. [3]

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12. (a) The total cost of the gas Farida used in 2019 was £432.
To work out how much she should pay for gas each month in 2020, her energy company divided this amount by 12.

How much did the energy company ask Farida to pay for gas each month in 2020? [2]

(b) Mo is working out the cost of his electricity bill.

His bill is for a period of 30 days.

During these 30 days he:
- pays a fixed charge of 20 pence **per day**,
- uses a total of 500 kilowatt-hours of electricity.

Mo pays 14 pence for every kilowatt-hour of electricity he uses.
He pays VAT of 5% on the total of these costs.

How much is Mo's electricity bill? [6]

Examiner only

13.

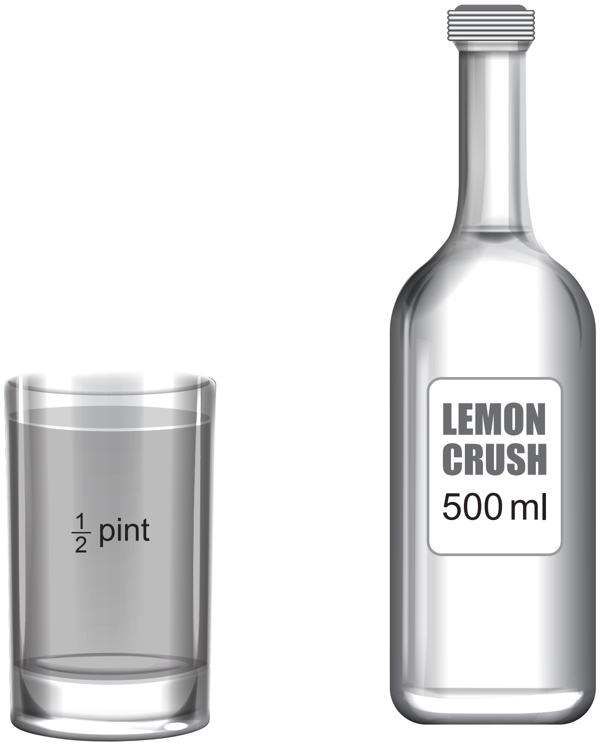
$\frac{1}{2}$ pint
LEMON
CRUSH
500 ml

Diagram not drawn to scale

Use: 1 pint = 600 ml

In a café:
a half-pint glass of *Lemon Crush* costs £1.50,
a 500 ml bottle of *Lemon Crush* costs £2.

Show that the bottle of *Lemon Crush* is better value for money. [3]

14. (a) Theo invests £45 000 and Jenny invests £35 000 in a new business.

(i) Write the ratio of Theo's investment to Jenny's investment in its simplest form. [2]

Theo : Jenny = ... : ....

(ii) At the end of the first year, Theo and Jenny shared the total profit made by the business in the ratio of their original investments.
Jenny made £21 000 profit.

What is the difference in the amount of profit made by Theo and Jenny? [3]

(b) The next year, the business makes a loss and Jenny decides to sell her share.

She loses all of her profit from the first year plus $\frac{3}{10}$ of her original investment.

Calculate the amount of money Jenny loses. [2]

15. Rearrange this formula to make n the subject. [2]

$$t = 5 + 3n$$

Turn over.

16. The diagram shows a ship's journey from *P* to *Q* to *R*.

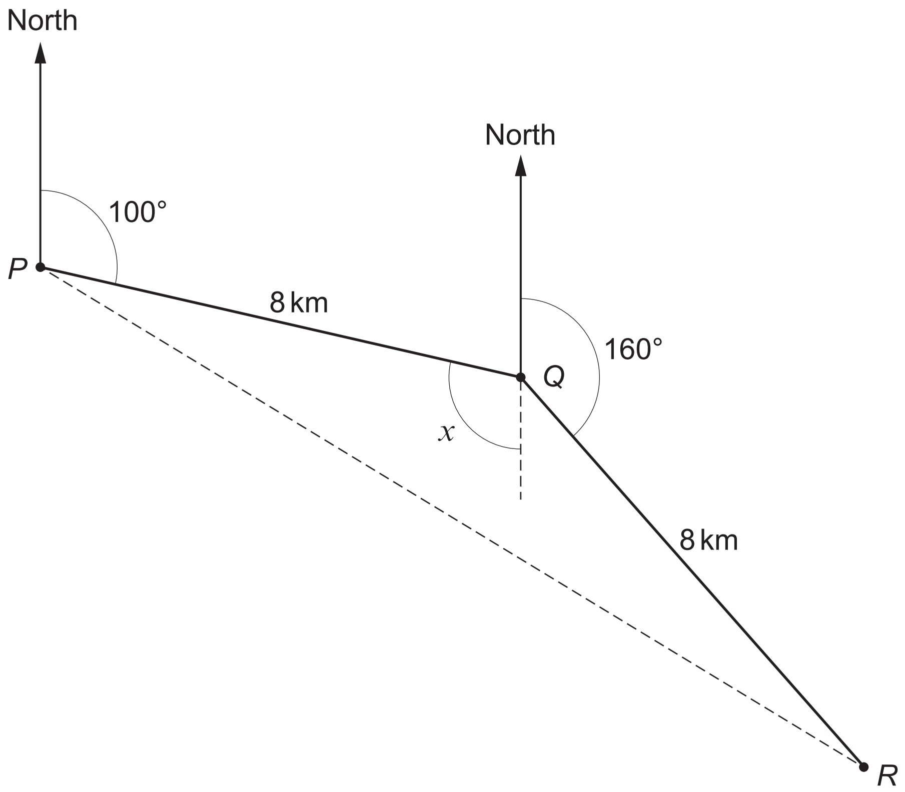

Diagram not drawn to scale

The ship travels on a bearing of 100° for 8 km from *P* to *Q*.
It then travels on a bearing of 160° for 8 km from *Q* to *R*.

(a) Explain why the angle x is 100°. [1]

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(b) Work out the bearing of *R* from *P*.
Give a reason for each step of your answer. [4]

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17. (a) Brad is a landscape gardener.

One working day, he spends:

- $\frac{3}{7}$ of his time designing a garden,
- $\frac{5}{14}$ of his time digging,
- the rest of his time buying plants.

What fraction of this working day does Brad spend buying plants? [3]

(b) Aroon is an architect.
One working day, he spends 324 minutes of his time on paperwork.

This is $\frac{3}{5}$ of his working day.

For how many **hours** does Aroon work on this day? [3]

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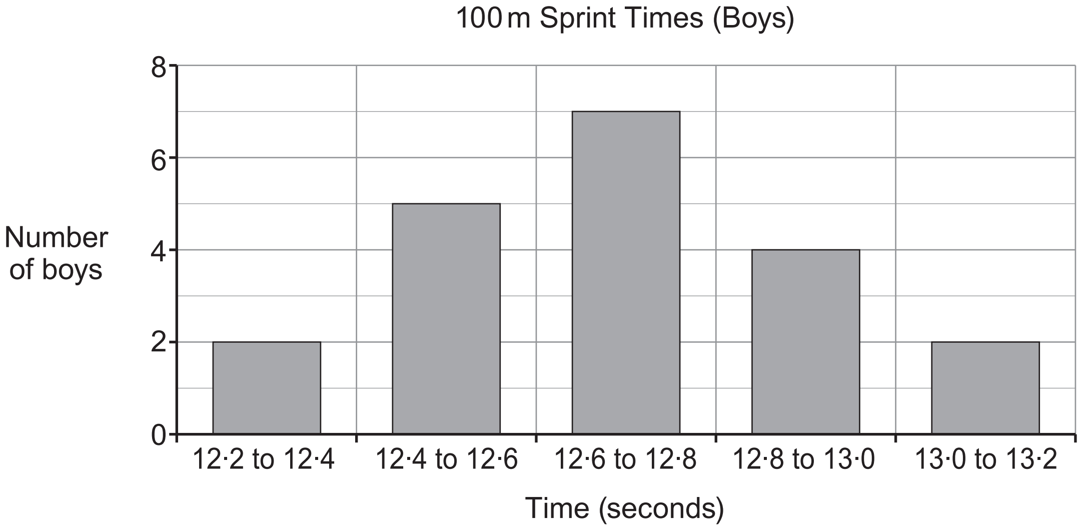
18. (a) Twenty teenage boys take part in sprint races over 100 metres. One of the boys draws a graph to summarise their times.



Make one criticism of the diagram. [1]

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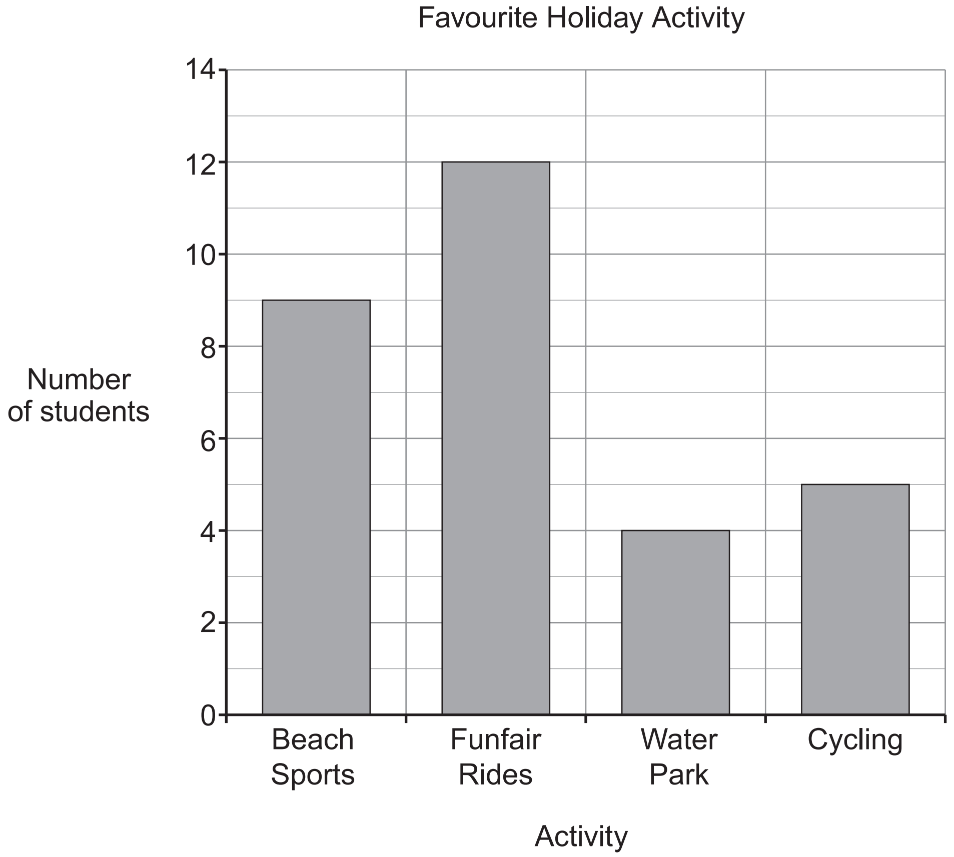
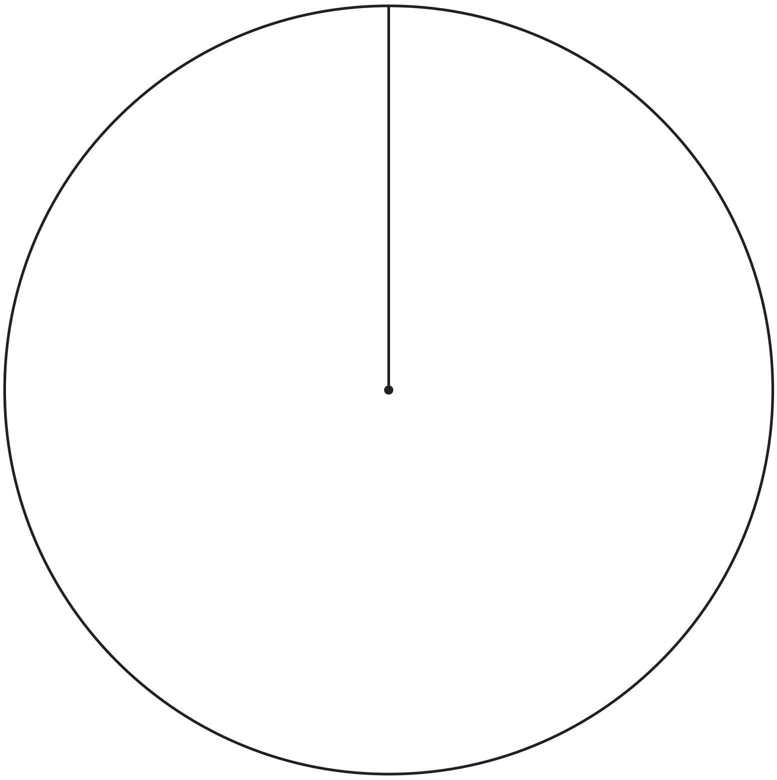
(b) The bar chart shows the favourite holiday activity of a group of 30 students.



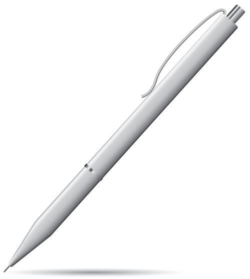
Use the bar chart to complete the pie chart opposite.
You may use the table to help you.
You must show all your working. [5]

Favourite Holiday Activity		
Beach sports (B)		
Funfair rides (F)		
Water park (W)		
Cycling (C)		



19. In 2019,

- €1 = £0.90,
- $1.25 = £1.



In 2019, a silver pencil cost €110 in Germany.
The same pencil cost $125 in the USA.

In which country was the pencil cheaper?

Germany ☐ USA ☐

You must show all your working. [3]

20. The diagram shows a parallelogram, *ABCD* and the diagonal *AC*.

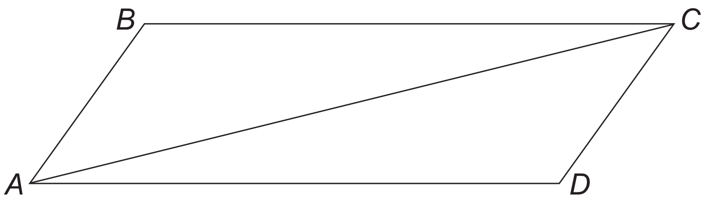


Diagram not drawn to scale

Tick **(✓)** the **two** correct statements. [2]

$A\hat{B}C$ is not equal to $C\hat{D}A$	
$AB = DC$ and $AD = BC$ and AC is a side of both triangle ABC and triangle CDA	
Triangle ABC is similar to triangle CDA with enlargement scale factor 0·5	
Triangle ABC is not congruent to triangle CDA	
Triangle ABC is congruent to triangle CDA	
AB represents the shortest distance from B to AC	

21. The diagram shows a cone placed with its circular base on a table.

It has

- base radius 15 cm,
- height 30 cm.

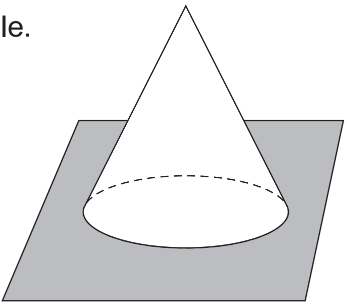


Diagram not drawn to scale

(a) Work out the volume of this cone.
Give your answer as a multiple of π. [3]

Volume is …………………………… cm^3

(b) On the 1 cm grid opposite, make an accurate scale drawing of the plan and side elevation of this cone.

Use the ratio

actual cone : scale drawing = 5 : 1. [4]

Plan

Side elevation

22. A tank contains 225 litres of water.
A tap at the bottom is opened so that water flows out at a constant rate of 5 litres every minute until the tank is empty.

(a) On the graph paper below, draw a line to show the volume of water in the tank at any time after the tap has been opened. [4]

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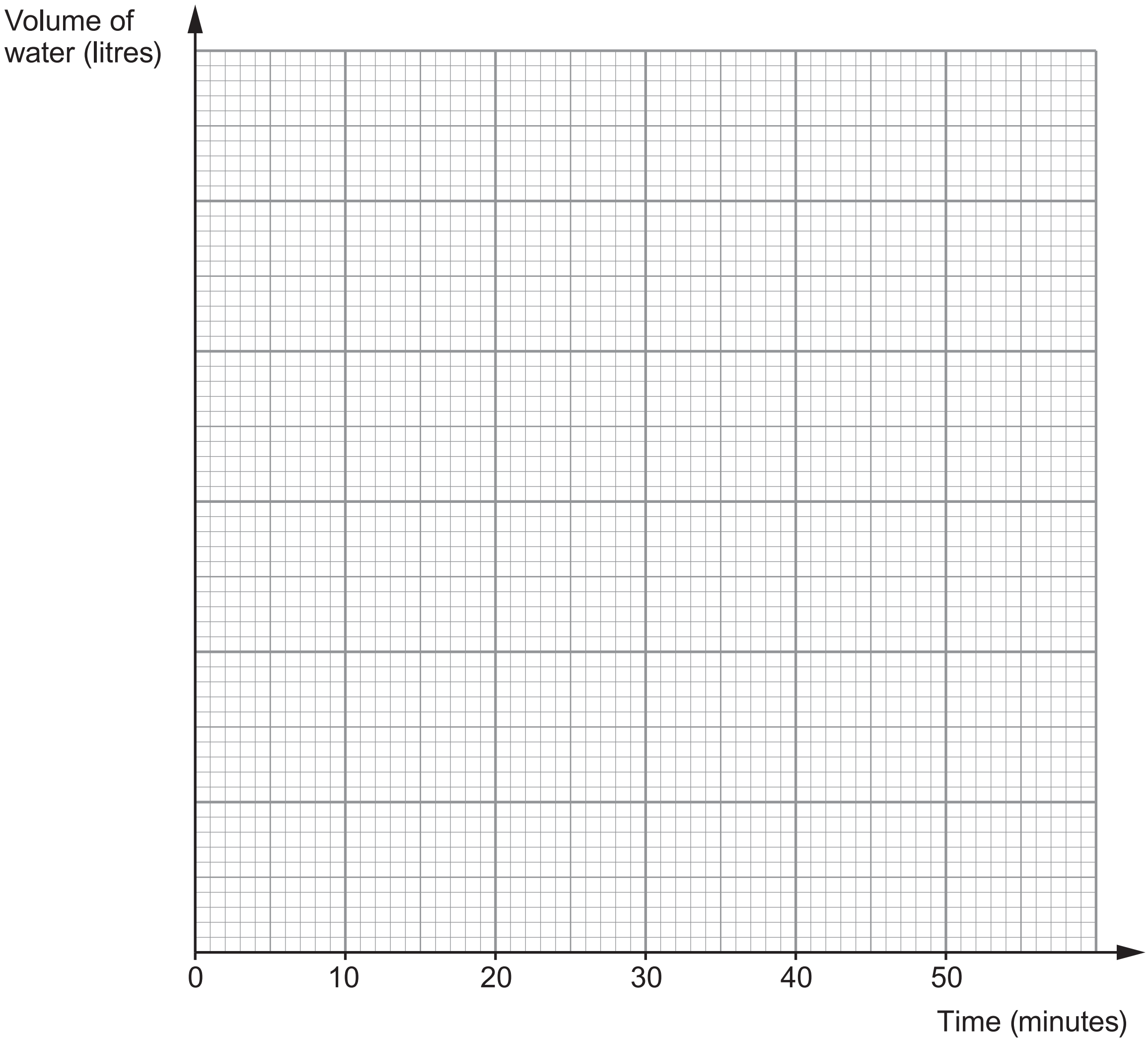

(b) How many minutes does it take for the volume of water in the tank to decrease by 40% of the original volume? [2]

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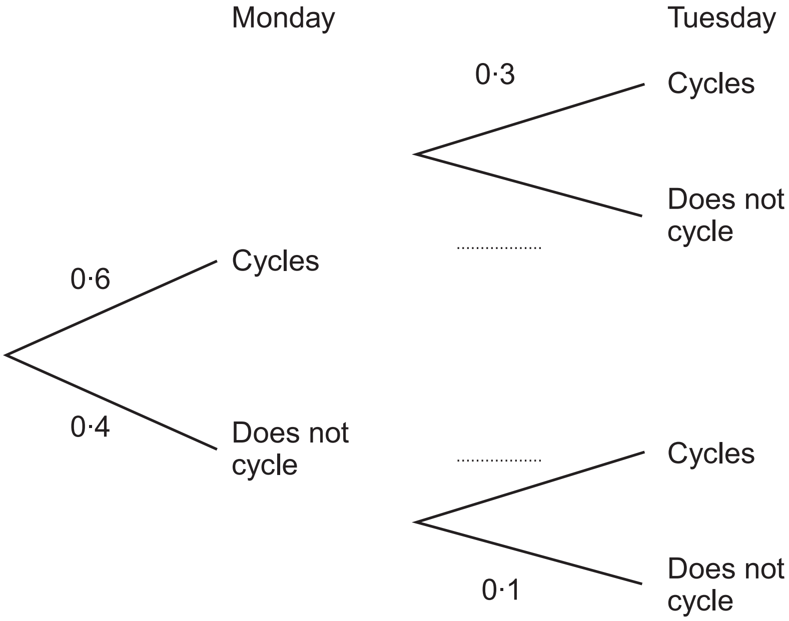
23. The probability that Kathy cycles to work on Monday is 0·6.
If she cycles to work on Monday, the probability that she cycles to work on Tuesday is 0·3.
If she does **not** cycle to work on Monday, the probability that she does **not** cycle to work on Tuesday is 0·1.

(a) Complete the tree diagram. [1]


Monday
Tuesday
0·3
Cycles
Does not cycle
....
0·6
Cycles
0·4
Does not cycle
....
Cycles
Does not cycle
0·1

(b) Calculate the probability that Kathy cycles to work on both Monday and Tuesday. [2]

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....

(c) Calculate the probability that Kathy does **not** cycle to work on either day. [2]

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24. In a factory, 6 identical machines can make 3000 erasers in 2 hours.

How long would it take 8 of these machines to make 1000 erasers? [3]

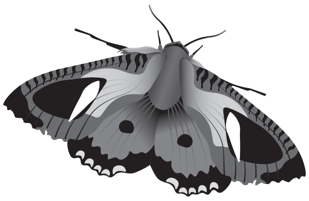
25. (a) Expand and simplify $(4x + 5)(2x - 1)$. [3]

(b) (i) Factorise $x^2 - 10x + 21$. [2]

(ii) Use your answer to part (b)(i) to write down the solutions of the equation $x^2 - 10x + 21 = 0$. [1]

x = ... or x = ...

26. Vikram wanted to find out how many moths there were in a small woodland.



One night, Vikram captured a random sample of 12 moths and marked them.
He then released them back into the woodland.

The next night, Vikram captured a second random sample of 30 moths.
He found that 9 of the moths in the second sample had been marked.

Vikram estimated that there were 40 moths in the woodland.

(a) Show that Vikram's estimate of the number of moths was correct. [2]

(b) Comment on how reliable Vikram's estimate was likely to be. [1]

END OF PAPER

Question number	Additional page, if required. Write the question number(s) in the left-hand margin.

Examiner only