Surname	Centre Number	Candidate Number
First name(s)		0

GCSE

C300U10-1

A19-C300U10-1

TUESDAY, 5 NOVEMBER 2019 – MORNING

MATHEMATICS – Component 1

Non-Calculator Mathematics
FOUNDATION TIER

2 hours 15 minutes

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

ADDITIONAL MATERIALS

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.

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 continuation 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.

C300U101
01

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:

$$v = u + at$$

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

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

Examiner only

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

(i) 541 + 59 [1]

(ii) 350 ÷ 5 [1]

(iii) 1·076 – 0·15 [2]

(b) 526 × 7·9 = 4155·4

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

(c) Using numbers and symbols Anil correctly writes

minus one is greater than minus two.

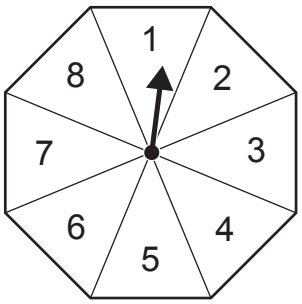
Circle what Anil writes.

$-1 \leqslant -2$ $-1 \geqslant -2$ $-1 > -2$ $-1 < -2$ $-1 = -2$ [1]

C300U101
03

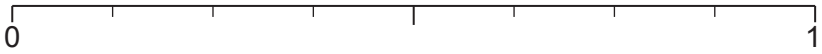
Examiner only

2. *(a)*



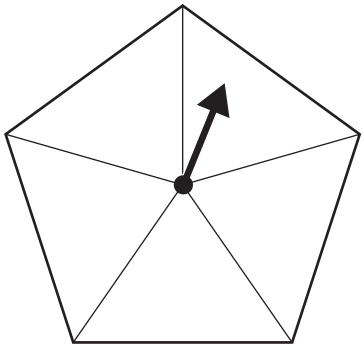
The diagram shows a fair spinner for a simple game.
Rhian needs to score 7 or more with a single spin to win the game.

On the probability scale below, mark with an arrow the probability that Rhian wins the game. [1]

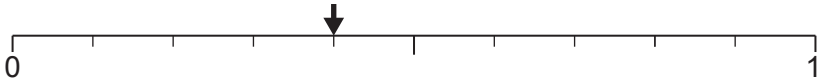


(b) Tomas is playing a game with a different fair spinner.

Here is the shape of his spinner.



The arrow on the probability scale below shows the probability that Tomas scores less than 4 with one spin.



Write five numbers on Tomas' spinner so that the scale is correct. [1]

(c) Simon is playing a game.
The probability that he wins the game is 0·7.

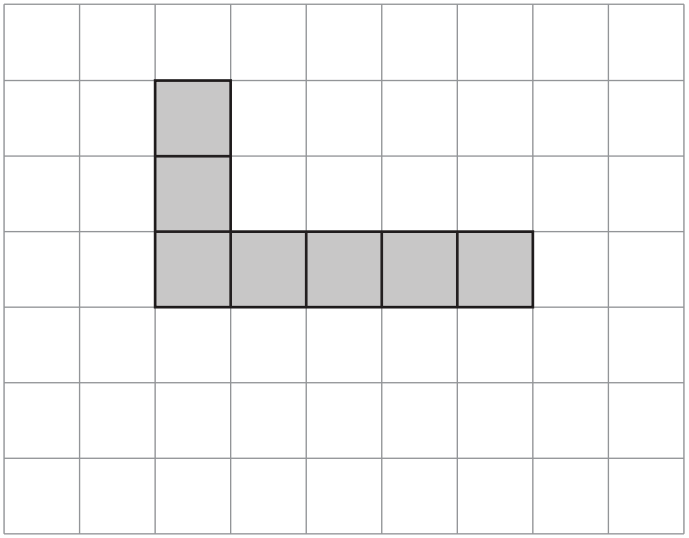
What is the probability that Simon does not win his game? [1]

.....

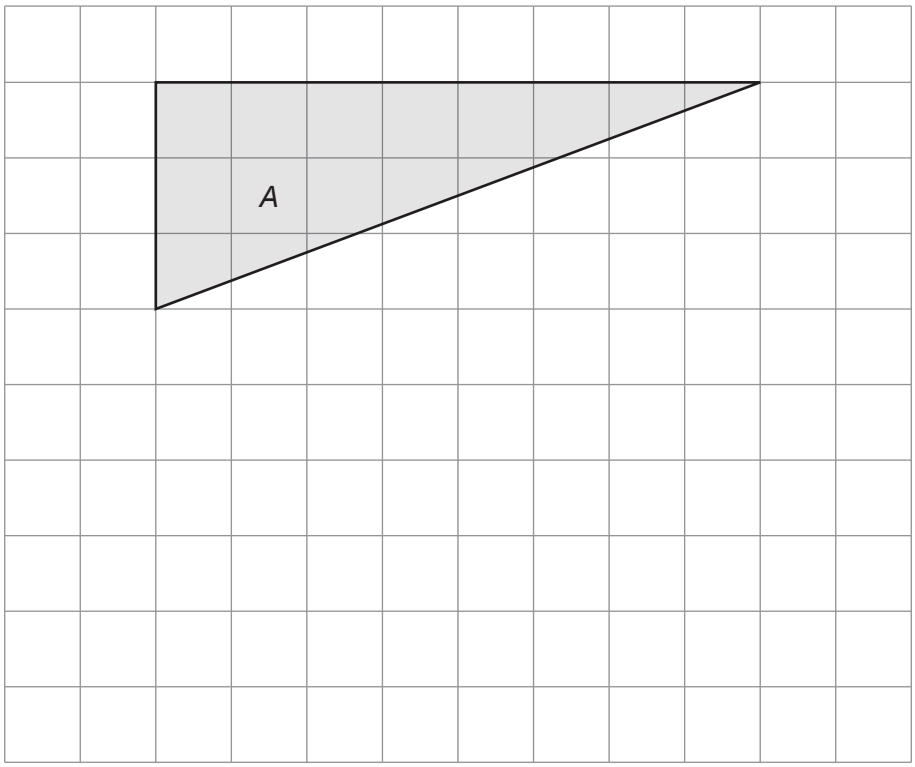
.....

Examiner only

3. *(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]



C300U101
05

Examiner only

4. Ted is a salesman.
His pay is calculated using this formula.

$$\text{Ted's pay} = 100 + \frac{\text{value of Ted's sales}}{5}$$

(a) One week the value of Ted's sales was £800.

What was Ted's pay for this week? [2]

.....

.....

.....

.....

.....

Ted's pay £ .....

(b) The next week Ted's pay was £400.

What was the value of Ted's sales for this week? [2]

.....

.....

.....

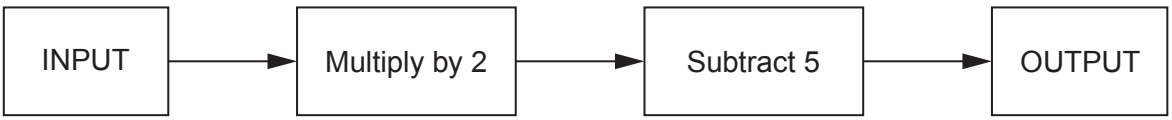
.....

.....

Value of Ted's sales £ .....

Examiner only

5. *(a)* Here is a number machine.



(i) The input is 10.
What is the output? [1]

.....

.....

(ii) The input is 4·5.
What is the output? [1]

.....

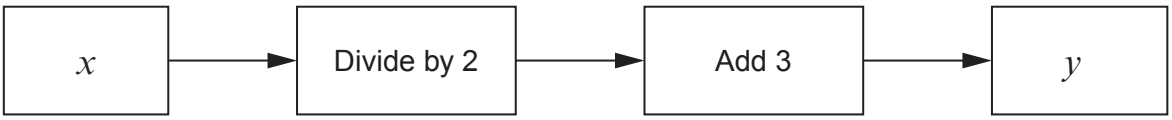
.....

(iii) The output is –3.
What is the input? [1]

.....

.....

(b) Here is a different number machine.



Circle the rule shown by this number machine.

$2x - 3 = y$ $\quad \frac{x}{2} + 3 = y$ $\quad x = \frac{y}{2} + 3$ $\quad x = 2y - 3$ $\quad \frac{x + 3}{2} = y$ [1]

C300U101
07

Examiner only

6. *(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]

.....

.....

Range .....

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

.....

.....

.....

.....

.....

.....

.....

.....

.....

Mean .....

Examiner only

(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]

..... , ... , ... , ...
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]

..... houses

Examiner only

7. *(a)* For five days in winter, the lowest temperature in Downdale was recorded. This information is shown in the table.

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Temperature in °C	2	0	–6	–4·5	–2

(i) Which day was the coldest? [1]

.....

(ii) Work out the difference between the lowest temperature on Monday and the lowest temperature on Thursday. [1]

.....

.....

Difference is ..... °C

(iii) On Saturday, the lowest temperature was 3°C colder than it was on Friday.

What was the lowest temperature on Saturday? [1]

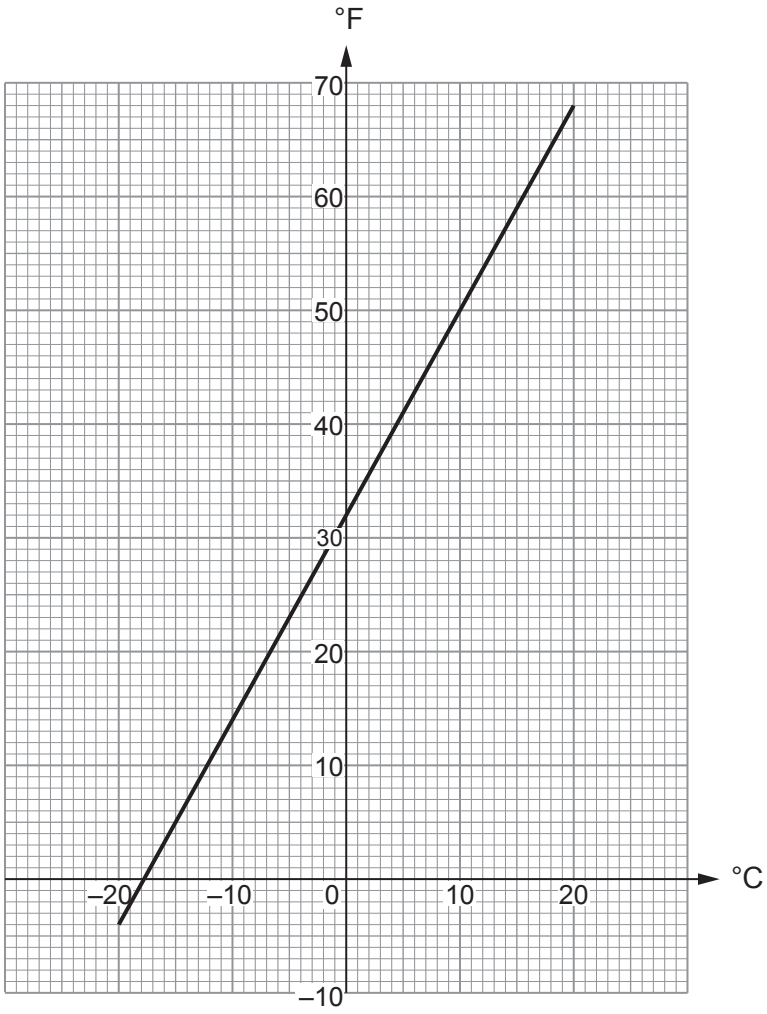
.....

.....

..... °C

Examiner only

(b) This conversion graph may be used to change between temperatures in degrees Celsius (°C) and temperatures in degrees Fahrenheit (°F).



(i) Use the graph to change 50°F to °C. [1]

..... °C

(ii) Use the graph to change –5°C to °F. [1]

..... °F

(iii) One day it is 18°C in Bristol and 67°F in New York.

Is Bristol warmer than New York on this day?

Yes ☐ No ☐

Show how you decide. [1]

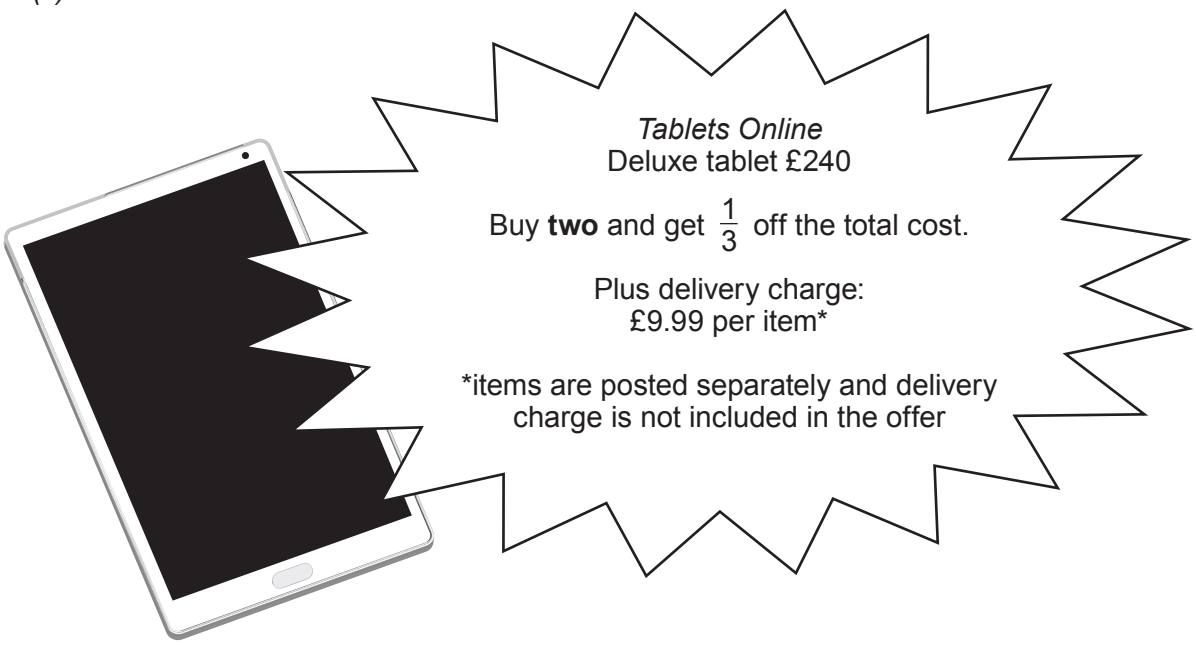
.....

.....

.....

Examiner only

8. *(a)*



Rosie buys two Deluxe tablets from *Tablets Online* and has them delivered.

How much does Rosie pay? [4]

.....

.....

.....

.....

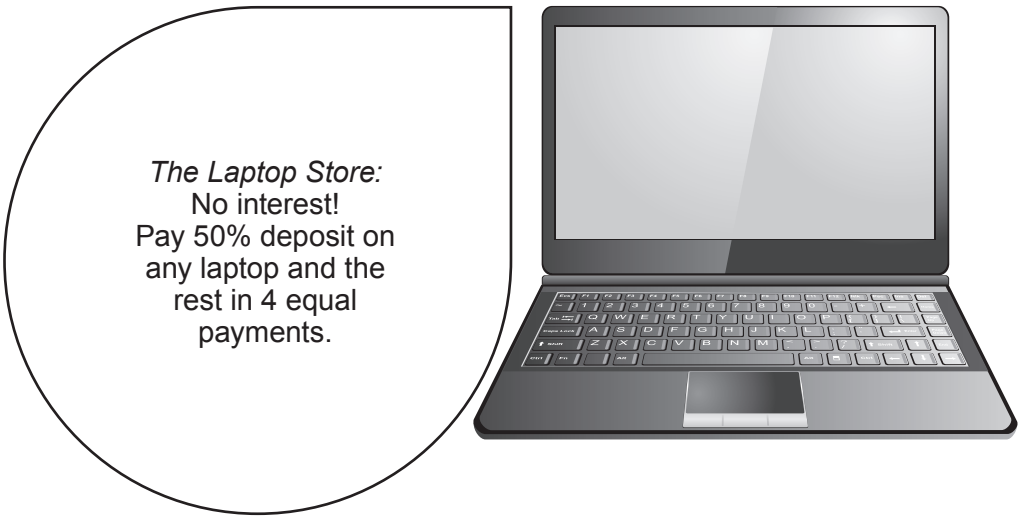
.....

.....

Rosie pays £ .....

Examiner only

(b)



Jim bought a laptop from *The Laptop Store*.
He paid his deposit and the rest of the cost in 4 payments of £108.

How much did Jim pay for his laptop in total? [3]

.....

.....

.....

.....

.....

.....

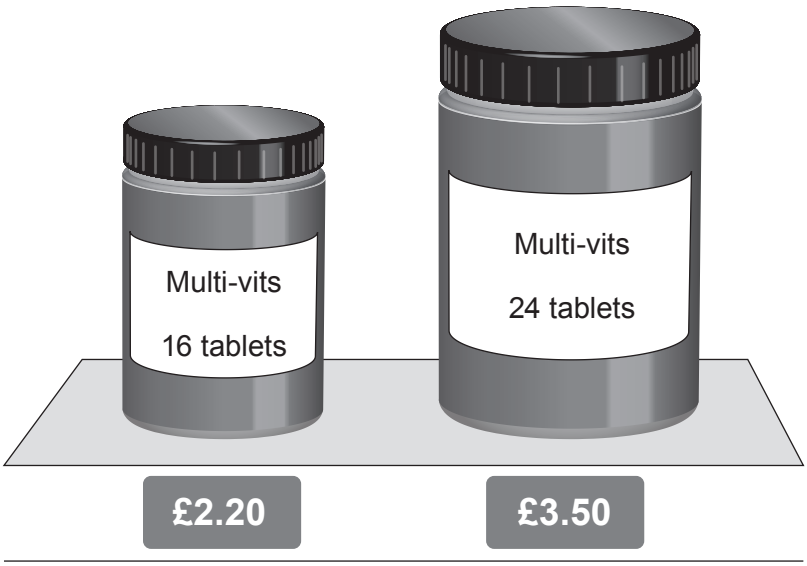
Jim paid £ .....

C300U101
13

Examiner only

9. 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]

Examiner only

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

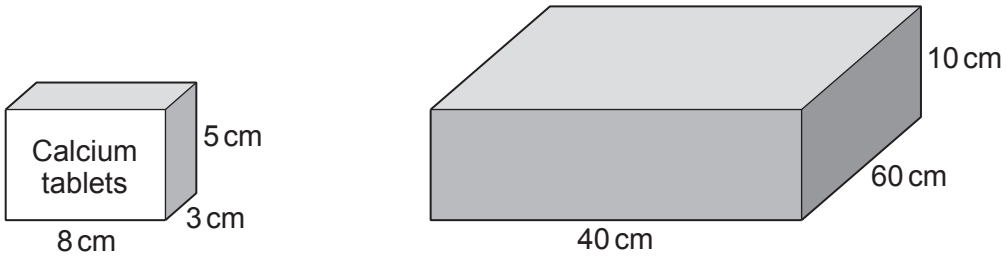


Diagram not drawn to scale

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]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

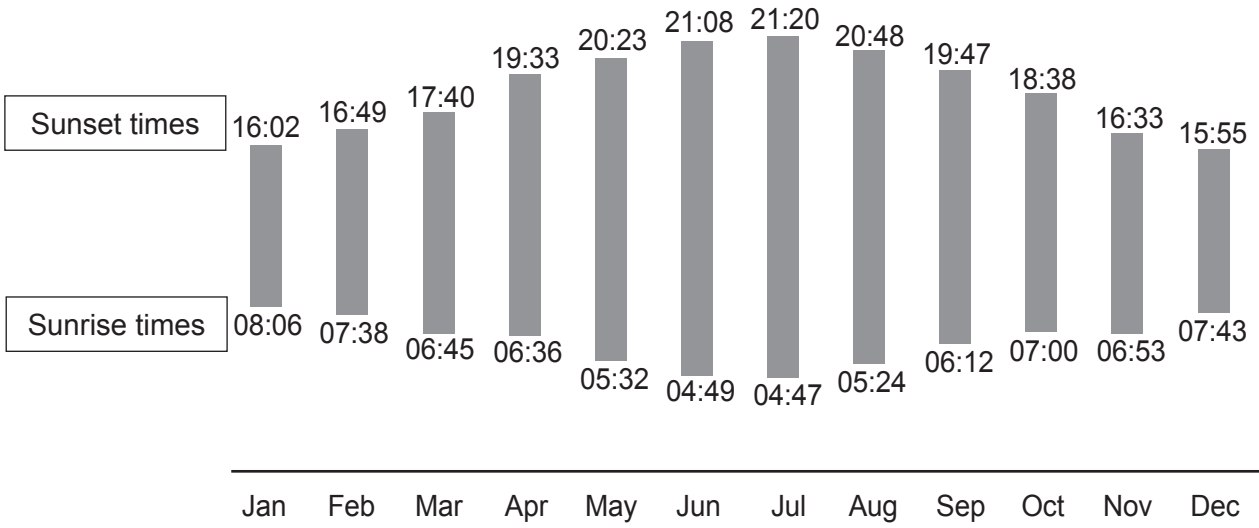
.....

..... tablets in one small box

C300U101
15

Examiner only

10. The graph shows the sunrise and sunset times on the 1st day of each month in London in 2018.



(a) What was the sunrise time on 1st December 2018? [1]

.....

(b) Use the graph to **estimate** the sunset time on 15th April 2018. [1]

.....

.....

(c) The amount of daylight is the difference between the sunrise and sunset times.

(i) On the 1st of which month was the amount of daylight the greatest? [1]

.....

(ii) How many hours and minutes of daylight were there on this day? [2]

.....

.....

.....

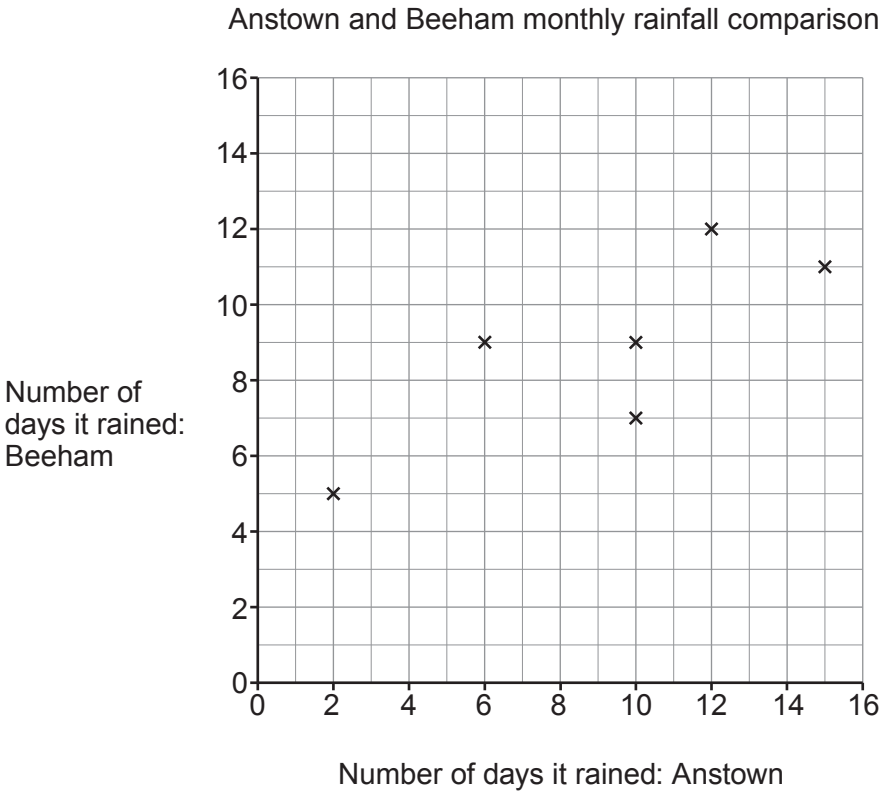
.....

..... hours ..... minutes

Examiner only

11. Anisha wants to compare the number of days it rained each month, in Anstown and Beeham, in 2018.

(a) Anisha has plotted the data for the first 6 months on the scatter graph below.



The data for the last 6 months is given in the table.

Number of days it rained: Anstown	4	9	8	13	14	15
Number of days it rained: Beeham	7	9	6	10	12	13

Plot the data for the last 6 months on the scatter graph above. [2]

(b) What does your scatter graph show about the relationship between the number of days it rained in Anstown and the number of days it rained in Beeham? [1]

.....

.....

.....

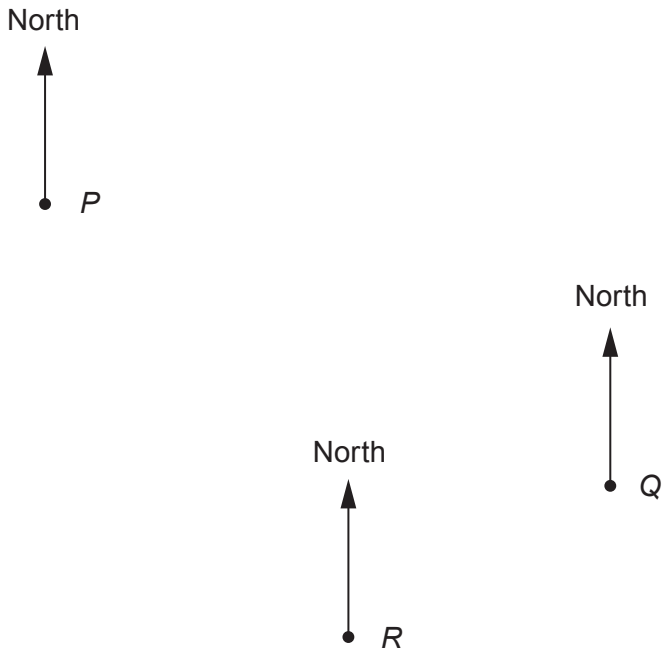
(c) Use the scatter graph to find how many months it rained on 11 days or more in **both** Anstown and Beeham? [1]

.....

.....

Examiner only

12. 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.



Scale: 1 cm represents 0·5 km

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

How much nearer? [2]

.....

.....

..... km

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

.....

(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]

Examiner only

13. *(a)* Eva's grandchildren all live in Wales or Australia.

$\frac{2}{7}$ of her grandchildren live in Wales.

15 of her grandchildren live in Australia.

How many grandchildren does Eva have? [3]

.....

.....

.....

.....

.....

..... grandchildren

(b) Eva lives in Wales.
When she goes to Australia for a visit, she always changes £400 into Australian dollars (A$).

When she went in 2018, the exchange rate was £1 = A$ 1.70.
When she went in 2016, the exchange rate was £1 = A$ 2.00.

How many more Australian dollars did Eva receive in 2016 than she did in 2018? [3]

.....

.....

.....

.....

.....

A$ ..... more

Examiner only

14. 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]

.....

.....

.....

.....

.....

.....

.....

.....

Total bill for tea and coffee £ .....

Examiner only

(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	

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]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... teachers per minute

Examiner only

15. *(a)* There are 45 swimmers in *Top Swim* club.

All swimmers are learning butterfly and backstroke and are asked which they prefer.

- $\frac{3}{5}$ of all swimmers prefer backstroke.
- The number of juniors is double the number of seniors in the club.
- $\frac{1}{6}$ of the juniors prefer butterfly.

Work out the proportion of swimmers who are seniors and prefer backstroke.
You may use the table to help you. [5]

	Prefer to swim		Total
	Butterfly	Backstroke	
Seniors			
Juniors			
Total			45

.....

.....

.....

.....

.....

.....

.....

Proportion .....

Examiner only

(b) *The Sharks* club has two types of membership: swimmers or divers.
The ratio of swimmers to divers is 8 : 3.
18 members of the club are divers.

How many members does *The Sharks* club have? [2]

.....

.....

.....

.....

.....

..... members

16. Make x the subject of the following formula. [2]

$$y = \frac{x+3}{4}$$

.....

.....

.....

Examiner only

17. *(a)* (i) Write $4{\cdot}8 \times 10^{-3}$ as an ordinary number. [1]

.....

.....

(ii) Work out the value of $(2{\cdot}5 \times 10^{20}) + (9 \times 10^{20})$.
Give your answer in standard form. [2]

.....

.....

.....

.....

(b) In 2018, the total volume of ice in the Greenland ice sheet was $2{\cdot}99 \times 10^{6}$ km^3.
The total surface area of the ice sheet was $1{\cdot}799 \times 10^{6}$ km^2.

Assuming that the depth of the ice was constant for the whole ice sheet, **estimate** the depth of the ice in 2018.
You must state the units of your answer. [3]

.....

.....

.....

.....

Depth of ice = ... Units .....

Examiner only

18. Gita is carrying out a survey to find out what people think of a proposed new road for Redville.

(a) Gita decides to ask the first 20 people she meets at Redville bus station between 8 a.m. and 9 a.m. on a Monday morning.

Give **two** reasons why this plan is unlikely to produce reliable results. [2]

Reason 1:

.....

.....

Reason 2:

.....

.....

(b) Here is a question from Gita's survey:

How often do you use your car?

1 – 2 ☐ 3 – 4 ☐ 4 – 5 ☐ 6 + ☐

Make **two** criticisms of Gita's question. [2]

Criticism 1:

.....

.....

Criticism 2:

.....

.....

Turn over.

Examiner only

19. The diagram shows a cylinder.

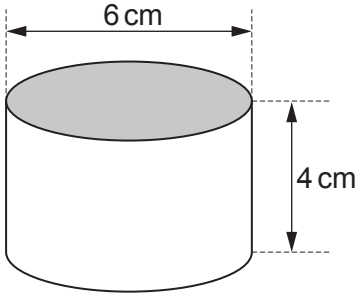


Diagram not drawn to scale

On the 1 centimetre grid below, draw accurately:

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

Plan

Side elevation

Examiner only

20. Huw has a maths test.

(a) For the first question, Huw divides 752 by a whole number.
His answer, which is correct, is 25 remainder 27.

What whole number did Huw divide by? [3]

.....

.....

.....

.....

(b) The second question is:

> The only food provided for guests at Seaview Hotel is breakfast. The hotel has enough food to make breakfast for 20 guests for 6 days.
> How long would the food last 30 guests?
> You may assume each guest eats the same amount of food for breakfast.

Here is Huw's working.

(i) Without working out the correct answer, explain why Huw's answer of 9 days is incorrect. [1]

.....

.....

(ii) Work out the correct answer. [2]

.....

.....

.....

.....

.....

..... days

Examiner only

21. Shania has two pieces of ribbon.

One piece is $5\frac{1}{4}$ metres long.

The difference between the lengths of the two pieces is $2\frac{9}{20}$ metres.

Work out the **two** possible lengths of the other piece of ribbon.
Give each of your answers as a mixed number in its simplest form. [4]

Examiner only

22.

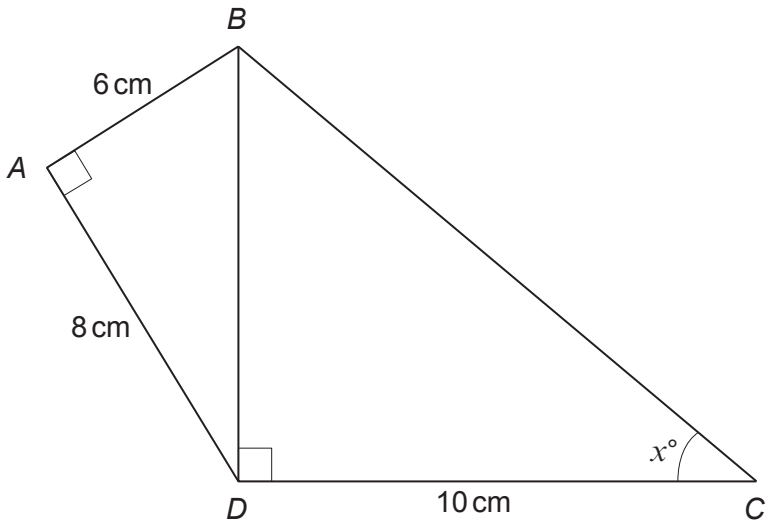


Diagram not drawn to scale

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

.....

.....

.....

.....

.....

.....

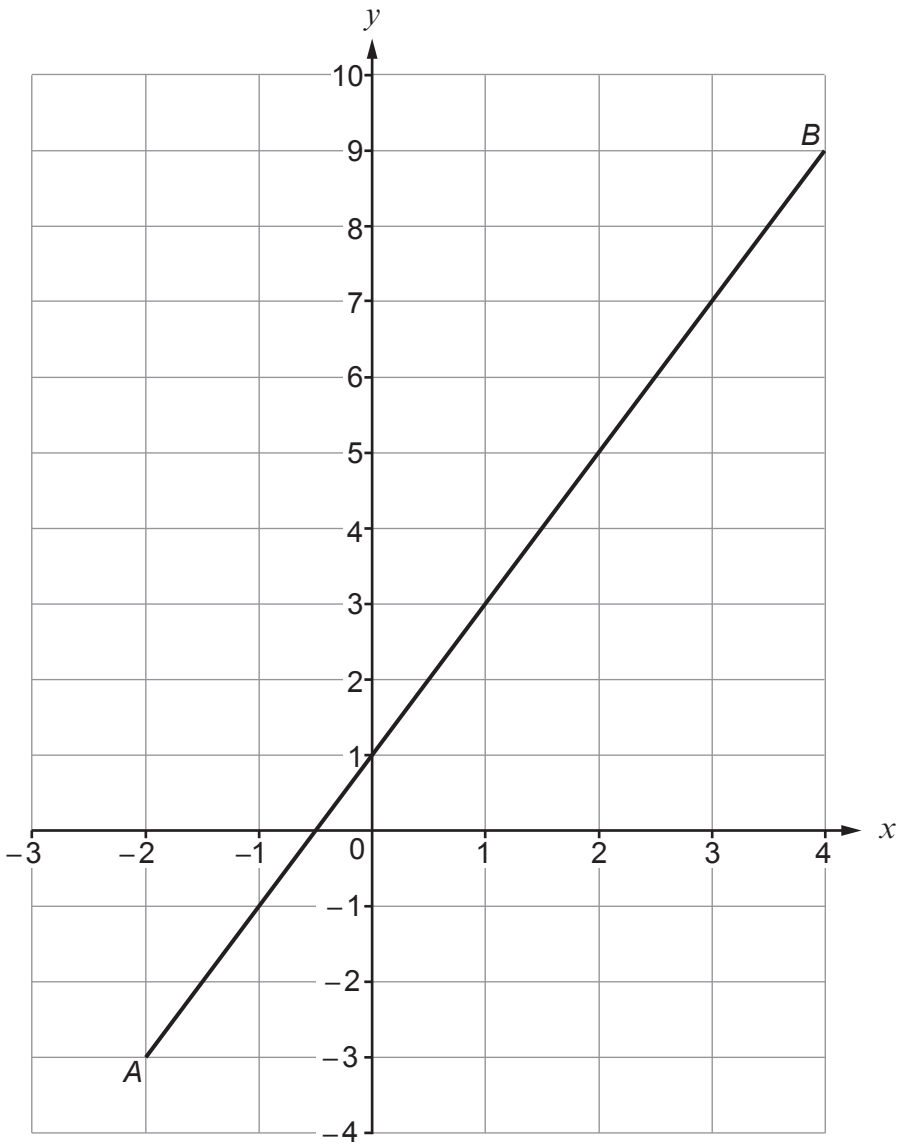
.....

.....

x = ...

Examiner only

23.



The diagram shows the graph of a straight line, *AB*.

Find the equation of this line.
Give your answer in the form $y = mx + c$. [3]

.....

.....

.....

.....

.....

.....

.....

$y =$ .....

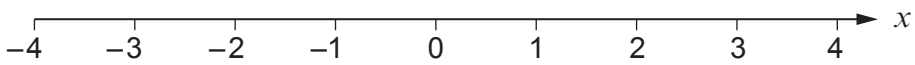
Examiner only

24. *(a)* Solve $5x - 1 = 3x + 4$. [2]

(b) Solve the following simultaneous equations. [2]

$$2x + y = 8$$
$$x - y = 1$$

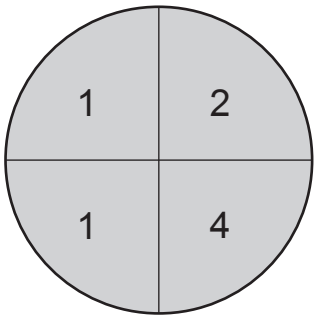
(c) Represent the inequality $-2 \leqslant x \leqslant 3$ on the number line below. [1]

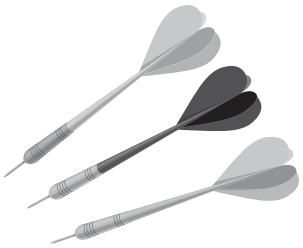


(d) Solve $\frac{2x}{3} < 4$. [2]

Examiner only

25. The diagram shows a dartboard with 4 sectors of equal size.





Sanjeev throws 3 darts which all hit this dart board.
Each dart is equally likely to hit any sector of the dart board.

He **multiplies** his three numbers to find his score.

Work out the probability that his score is an odd number. [2]

.....

.....

.....

.....

.....

.....

.....

END OF PAPER

Examiner only

For continuation only.

Examiner only

For continuation only.

BLANK PAGE