Surname	Centre Number	Candidate Number
Other Names		0

GCSE

C300U20-1

A18-C300U20-1

MATHEMATICS – Component 2
Calculator-Allowed Mathematics
FOUNDATION TIER

THURSDAY, 8 NOVEMBER 2018

– MORNING

2 hours 15 minutes

ADDITIONAL MATERIALS

A calculator will be required for 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 at the back of the booklet, taking care to number the question(s) correctly.

Take π as 3·14 or use the π button on your calculator.

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.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**5**	
2.	**3**	
3.	**3**	
4.	**5**	
5.	**4**	
6.	**2**	
7.	**5**	
8.	**4**	
9.	**4**	
10.	**5**	
11.	**5**	
12.	**6**	
13.	**4**	
14.	**7**	
15.	**5**	
16.	**3**	
17.	**9**	
18.	**6**	
19.	**2**	
20.	**2**	
21.	**4**	
22.	**2**	
23.*(a)*	**2**	
23.*(b)*	**5**	
24.	**2**	
25.	**2**	
26.	**6**	
27.	**5**	
28.	**3**	
Total	**120**	

C300U201
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. This is part of a menu in a restaurant.

Main courses		*Desserts*	
Lasagne	£8.95	Chocolate Brownie	£4.50
Casserole	£10.50	Lemon Tart	£3.75
Fish Pie	£9.99		

(a) The Smith family have:

- 2 Casseroles,
- 2 Fish Pies,
- 3 Chocolate Brownies,
- 1 Lemon Tart.

(i) Find the total cost of their meals. [2]

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(ii) Round your answer to the nearest ten pounds. [1]

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(b) The next day, the restaurant has a special offer.

> Order 4 main courses and get the cheapest free.

A group of 4 friends has:

- 1 Lasagne,
- 2 Casseroles,
- 1 Fish Pie.

Calculate the total amount that the group spends using the special offer. [2]

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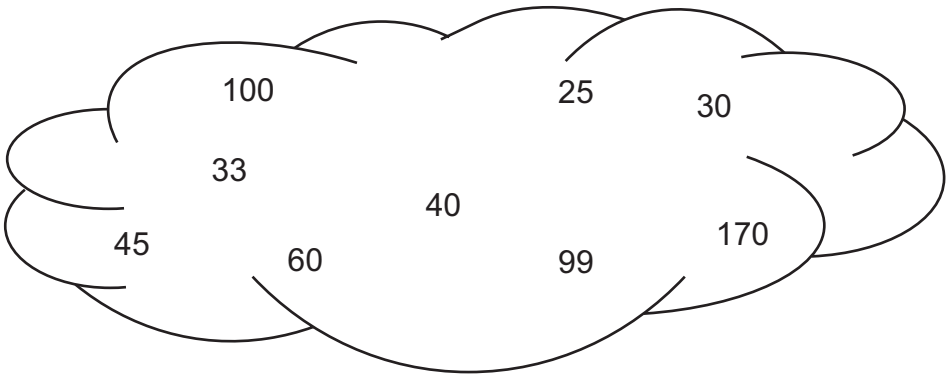
Examiner only

2. *(a)* Circle the numbers that are multiples of **both** 3 and 5. [2]



(b) Lauren says,

"37 is a factor of 888."

Show that she is correct. [1]

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Examiner only

3. *(a)* (i) Work out the exact value of $\frac{2{\cdot}8 + 3{\cdot}5}{8}$. [1]

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(ii) Write your answer correct to 2 decimal places. [1]

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(b) Harvey has used his calculator to work out that $23 \times 56 = 1288$.

Without using multiplication, what calculation could he do to check that this answer is correct? [1]

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Examiner only

4. Connie reads this sign at a fairground:

> Rides £4.80 each
> Buy a wristband for £6 then all rides £3 each

(a) How much would Connie pay to buy a wristband and go on 9 rides? [2]

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(b) Complete the following statement.

'It is only worth buying a wristband if you plan to go on ..... or more rides.'

You must show all your working. [3]

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Examiner only

5. A bar of chocolate contains 80 g of fat.

The chocolate bar is divided into 32 pieces.

(a) How many grams of fat are in 5 pieces of chocolate? [2]

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(b) (i) What assumption did you make about the pieces of chocolate? [1]

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(ii) If you had not made this assumption, how would the answer to *(a)* be different? [1]

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C300U201
07

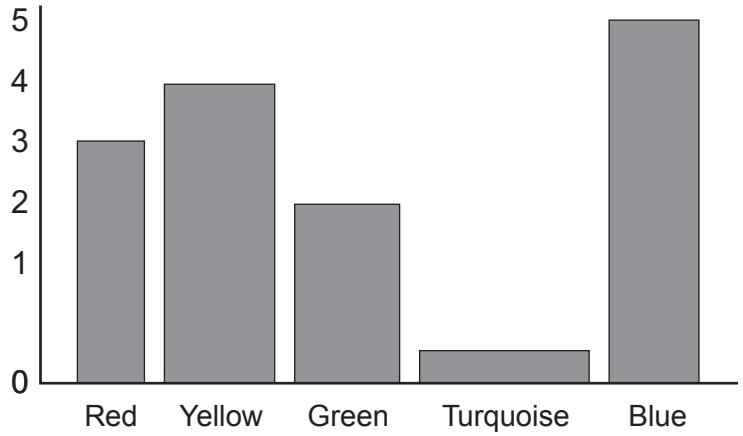
6. Draw lines to match each expression with its description.
The first one has been completed for you. [2]

$n + 2$	Two multiplied by a number.
$n - 2$	A number subtract two.
$2n$	A number divided by two.
$\frac{n}{2}$	A number multiplied by itself.
$2 - n$	Two subtract a number.
n^2	A number add two.

Examiner only

7. *(a)* Michael drew the bar chart below to show some children's favourite colours.

Bar chart showing favourite colours



Write down two criticisms of this bar chart. [2]

First criticism:

.....

.....

Second criticism:

.....

.....

(b) The table below shows the country of birth of all students in Michael's tutor group.

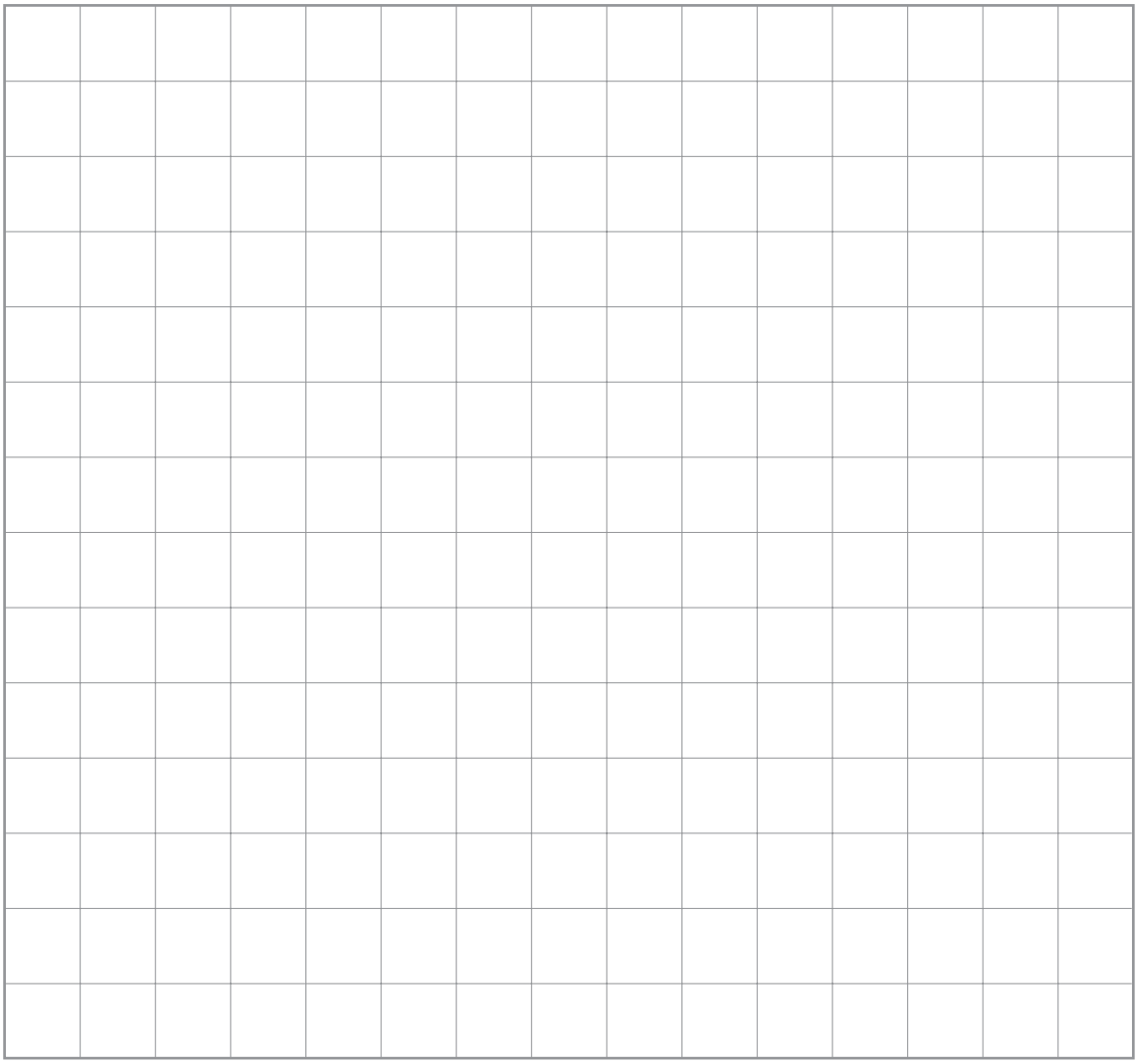
(i) Complete the table. [1]

Country of Birth	Tally	Frequency
Australia	|||	3
UK	.....	12
Latvia	𝍸 |	.....
Poland	𝍸 |||	8

Examiner only

(ii) On the grid below, draw a bar chart to show the information in the table. [2]

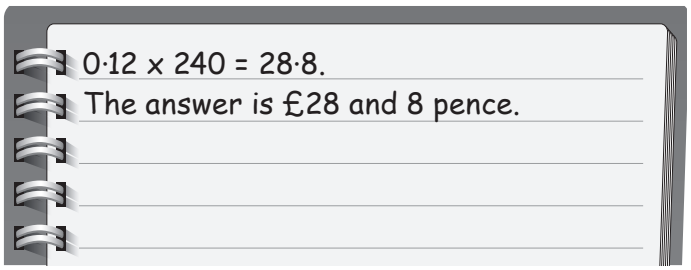
Bar chart showing the country of birth



Examiner only

8. *(a)* Connor has calculated 12% of £240.

This is his answer.



What is wrong with this answer? [1]

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(b) Connor is buying a new car for £16 000.
He pays a deposit of 14% when he places his order.
He pays the rest when he collects the car.

(i) Calculate 14% of £16 000. [2]

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(ii) Calculate the amount he has to pay when he collects the car. [1]

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Examiner only

9. The table below has been partly filled in to show the number of boys and girls in years 7, 8 and 9 at *Sir Henry Granger School*.

	Year 7	Year 8	Year 9	Total
Boys	.....	75	74	222
Girls	87	.....	72	236
Total	160	152	.....	458

(a) Complete the table. [2]

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(b) What is the difference between the number of Year 7 girls and the number of Year 9 girls? [1]

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(c) A student is to be chosen at random from these 458 students.

From which group is the student most likely to be chosen?
Circle the correct answer. [1]

Year 7 Boy Year 8 Boy Year 9 Boy

Year 7 Girl Year 8 Girl Year 9 Girl

Examiner only

10. *(a)* A train left London at 7:46 a.m. and arrived in Nottingham at 10:16 a.m.
How long did this journey take?
Circle the correct time. [1]

3 hours 30 minutes 2·5 hours 2·7 hours

2·3 hours 3·3 hours

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(b) The following is an extract from a train timetable.

Kettering	05:55	06:08	06:31	06:48	07:05
Wellingborough	06:03	06:16	06:39	06:57	07:14
Luton	06:27		07:05		07:44
London	06:54	07:08	07:36	07:55	08:09

Nerys needs to take a train from Kettering to London to go to a meeting.
Use the following information to work out the latest train that Nerys could take.

- Her meeting starts at 08:45.
- It takes 1 hour to travel from the London station to the meeting. [2]

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The latest train that Nerys could take leaves Kettering at .....

(c) The train uses 11·15 litres of fuel every minute.
It takes 5 hours to use all the fuel from a full tank.

How many litres of fuel does the full tank hold? [2]

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Examiner only

11. *(a)* Write down the next two terms for this sequence

17, 31, 45, 59, ……. , ……. [1]

(b) For the sequence below, what is the rule for finding the next term?

13, 26, 52, 104, ……. [1]

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(c) Hannah and Faith are working with the following sequence.

4, 7, 12, 19, 28, …….

(i) Hannah says,

'The 4th term is $4^2 + 3$ which is 19. The 5th term is $5^2 + 3$, which is 28.'

Use Hannah's method to find the 15th term. [1]

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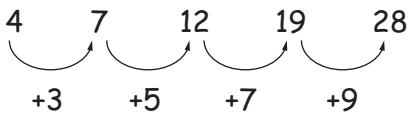
(ii) Faith looks at the differences between the terms. She writes,



The difference increases by 2 each time.

Continue Faith's method to find the 7th term.
You must show all your working. [1]

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(iii) Hannah and Faith are working out the 100th term.
Who has the quicker method?

Hannah ☐ Faith ☐

Give a reason for your answer. [1]

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Examiner only

12. *(a)* A pie filling is made using 3·5 kg of apples and 475 g of blackberries.

(i) Change 3·5 kg into grams. [1]

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(ii) Write the quantity of apples to the quantity of blackberries as a ratio, in its simplest form. [2]

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(b) Fruit tarts are made using strawberries and raspberries.

$\frac{5}{8}$ of the filling is strawberries.

$\frac{3}{8}$ of the filling is raspberries.

A total of 2440 g of fruit is used.
Calculate the mass of strawberries and the mass of raspberries used. [3]

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Mass of strawberries ..... g

Mass of raspberries ..... g

Examiner only

13. The table shows some facts about electricity.

Fact	Formula
Power = Voltage x Current	$P = VI$
Voltage = Current x Resistance	$V = IR$
Charge = Current x Time	$Q = It$
Energy = Voltage x Charge	$E = VQ$

(a) Calculate V when I = 2·5 and R = 0·7. [1]

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(b) Calculate E when the Voltage is 240 and the Charge is 12. [1]

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(c) Calculate the Time when the Charge is 75 and the Current is 12·5. [2]

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Examiner only

14. *(a)* Write the following numbers in order of size. Start with the smallest.
You must show all your working. [2]

$$56\% \qquad \frac{139}{250} \qquad \frac{5}{9}$$

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....., ..., ...

(b) Calculate 237% of 360. [2]

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(c) Lynn is looking at a towing guide to help her choose a new car.

Safe Towing Guide		
Safe	Acceptable	Dangerous
The total mass of the trailer is less than 85% of the mass of the car.	The total mass of the trailer is between 85% and 100% of the mass of the car.	The total mass of the trailer is over 100% of the mass of the car.

The total mass of Lynn's trailer is 1750 kg.
The car that Lynn would like to buy has a mass of 2015 kg.

Is it safe, acceptable or dangerous for this car to tow her trailer?
You must show all your working. [3]

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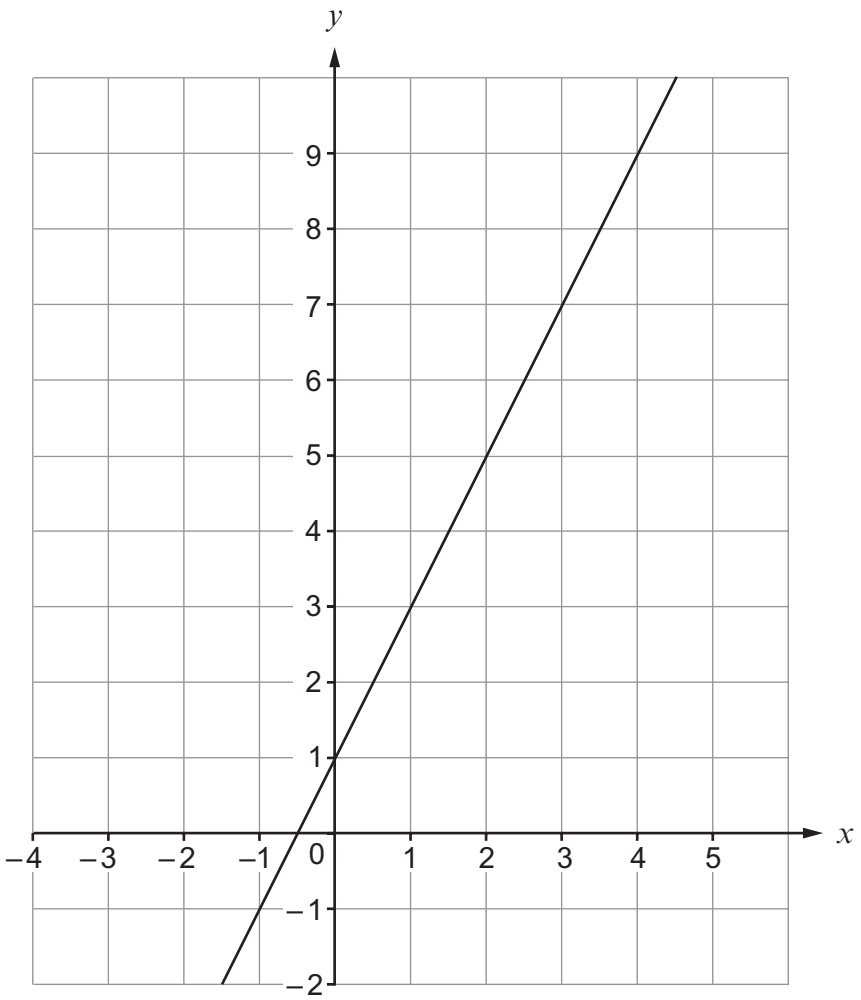
Circle your conclusion.

Safe Acceptable Dangerous

Examiner only

15. The diagram below shows the graph of the line $y = 2x + 1$.



(a) Write down the coordinates of the point where the line crosses the y-axis. [1]

(..... , ...)

(b) (i) Plot the following coordinates on the grid above. [1]

(–1, 5) (0, 5) (4, 5)

(ii) Write down the equation of the line that passes through these points. [1]

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(c) Which of the following points lie on the line $y = 2x + 1$?

Circle your answers. [2]

(5,11) (20,21) (20,41) (31,63) (10,31)

Examiner only

16. *(a)* Alfie wants to find out how much time teenagers spend watching television. He plans to visit the local library in the morning to survey 20 people.

Why is Alfie's plan not suitable? [1]

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(b) Shona is designing a questionnaire to find out about the number of hours students spend on their homework. She asks the following question.

How many pieces of homework do you have?

☐ 1 - 3 ☐ 3 - 5 ☐ 6 - 8 ☐ 9+

Give two criticisms of this question. [2]

First criticism

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Second criticism

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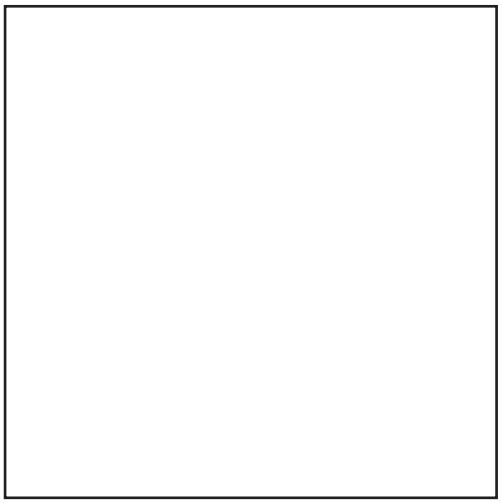
Examiner only

17. *(a)* This square has been drawn accurately.

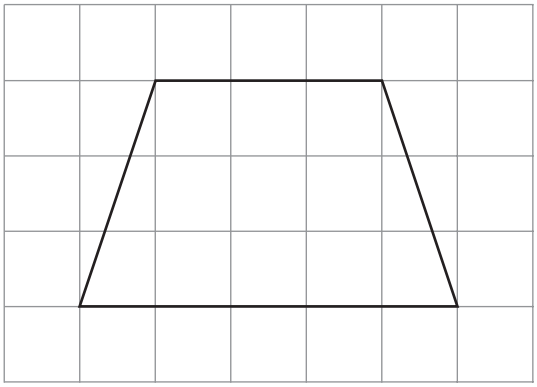


A rectangle has exactly the same area as the square.
The width of the rectangle is 5 cm.

Calculate the length of the rectangle.
You must show all your working. [6]

Examiner only

(b) The diagram below shows a quadrilateral on a grid.



(i) What is the special name of this quadrilateral? [1]

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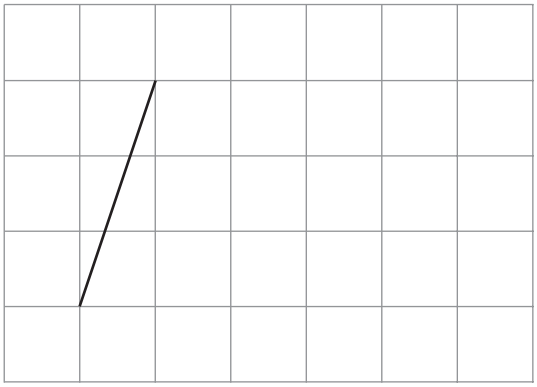
(ii) On the grid below, complete the drawing of a parallelogram that has the same area as the quadrilateral drawn above. [2]



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Examiner only

18. A biased dice has been used for an experiment.

The probabilities of 1, 2, 3 and 6 occurring on any throw of the dice are shown in the table below.

Number on dice	1	2	3	4	5	6
Probability	0·1	0·17	0·24			0·25

The probability of throwing a 4 is **the same** as the probability of throwing a 5.

(a) Complete the table. [3]

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(b) The dice is thrown once. Calculate the probability of throwing a number less than 4. [1]

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(c) The dice is thrown 600 times.
Show that a 2 is expected to occur more than 100 times. [2]

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Examiner only

19. The length of a football pitch is 94 m, correct to the nearest metre.

Complete the inequality below with the least and greatest values for the length of the football pitch. [2]

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..... $\leqslant$ Length $<$ .....

20. A length of wire is cut into 3 pieces.
The 2 shortest pieces are the same length.
The longest piece is 3 times the length of each of the shortest pieces.

(a) Write down the ratio of the lengths of the 3 pieces of wire. [1]

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(b) What fraction of the original length of wire is the longest piece? [1]

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Examiner only

21. Rearrange each of the following to make w the subject of the formula.

(a) $\frac{7}{w} = e$ [1]

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(b) $3(w + 5) - f = g$ [3]

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22. A road track measures 2·2 cm on a map with a scale of 1 : 25 000.

What is the actual length of the road track?
Give your answer in km. [2]

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Actual length ..... km

Examiner only

23. Gregor owns a restaurant.

(a) The diagram shows a circular place mat.

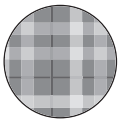

Diagram not drawn to scale

The radius of the circular place mat is 14 cm.

Calculate the circumference of the circular place mat. [2]

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Examiner only

(b) Gregor plans to buy some spoons and forks.

A bag of 24 spoons costs £19.95.
A box of 18 forks costs £15.55.
Bags and boxes cannot be split.

Gregor decides to buy the same number of spoons as forks.
He places an order to buy the smallest number of each that he can.

Complete the details on the order form shown at the bottom of the page.
You must show all your working. [5]

Order form	Cost (For the required numbers ordered)
..... bags of spoons	.....
..... boxes of forks	.....
Total cost of the complete order £	

Examiner only

24. Gary measures the depth of a river in 6 places between two bridges.
The depths are as follows:

48·8 cm 55·1 cm 34·6 cm 75·2 cm 85·7 cm 96·1 cm

Gary decides to write each of the 6 depths correct to the nearest 10 cm.
He states that the median depth of the river between the two bridges is 70 cm.

Give two reasons why the method Gary used to obtain this median depth leads to an inaccurate result. [2]

Reason 1:

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Reason 2:

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Examiner only

25. A brand of toothpaste is available in two different sizes.

87·5 ml tube costs 49p.
125 ml tube costs 72p.

Which size of toothpaste offers the better value for money?
You must show all your working. [2]

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Examiner only

26. *(a)*

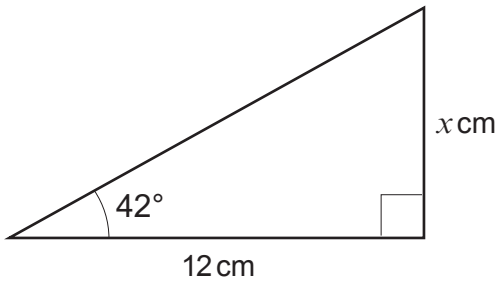


Diagram not drawn to scale

Calculate the value of x. [3]

(b)

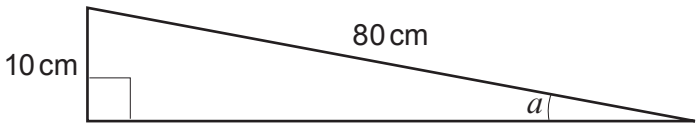
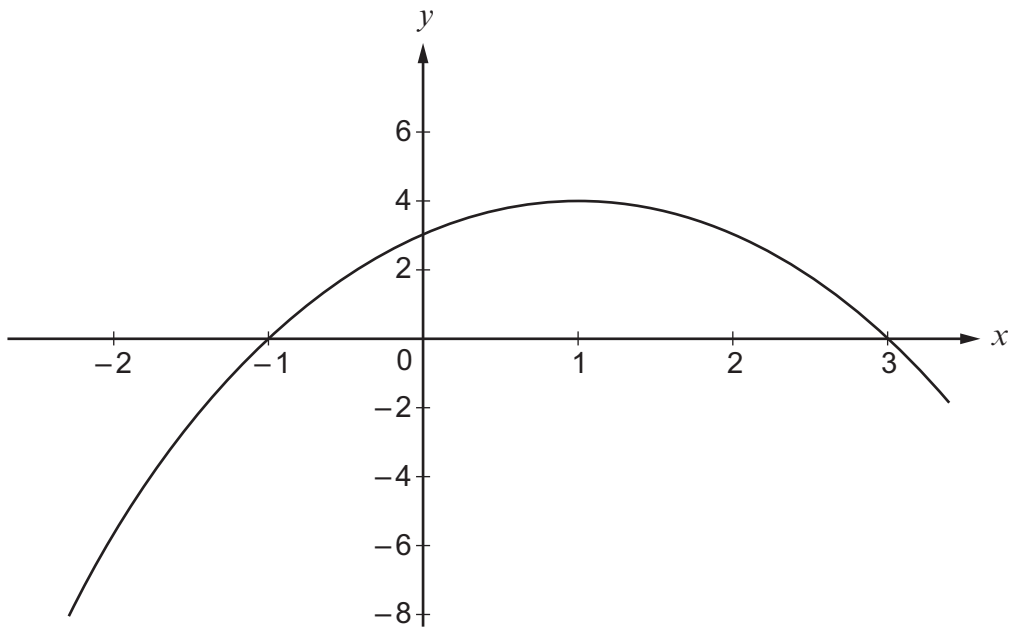


Diagram not drawn to scale

Calculate the size of angle a. [3]

Examiner only

27. A sketch of a graph representing the equation $y = 3 + 2x - x^2$ is shown below.



(a) Find the y-coordinate when $x = 0$. [1]

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(b) Find the y-coordinate when $x = -3$. [1]

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(c) Give the coordinates of the point where the sketch shows a gradient of zero. [1]

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(..... , ...)

(d) Find the coordinates of all points for which $3 + 2x - x^2 = 0$. [2]

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Examiner only

28. Ms Leighton arranged a £15 000 loan for 22 years to buy a canal boat.
After 22 years the loan is to be paid back in full together with compound interest at 3·4% per annum.

Ms Leighton did not plan to make any payments during the 22 years.

How much would Ms Leighton need to pay back after 22 years? [3]

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END OF PAPER

Examiner only

For continuation only.