GCSE

wjec cbac

C300U20-1

A17-C300U20-1

eduqas
Part of WJEC

MATHEMATICS – Component 2
Calculator-Allowed Mathematics
FOUNDATION TIER

MONDAY, 6 NOVEMBER 2017

– 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.

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 = $\pi r l$

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. The table below shows the rates for staying at a camping site.

	Cost per night	**Cost per week**
Small tent	£12	£75
Large tent	£17.50	£110
Caravan	£19.50	£115

(a) Emma has a small tent.
How much would it cost her to stay for 3 nights? [1]

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(b) Rogan's family have a large tent.
They will stay at the camping site for a week.
How much cheaper is the weekly rate than paying for 7 nights? [2]

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(c) Bilal's family have a caravan.

(i) Calculate the difference in cost between staying for 6 nights and staying for a week. [2]

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(ii) Explain why they should pay for a week instead of 6 nights. [1]

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(C300U20-1) **Turn over.**

2. A company uses the following formula to work out weekly pay.

> Pay = £7.50 x number of hours worked + £30

(a) Terry worked for 28 hours last week.
How much was he paid? [2]

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(b) (i) The company only pays for whole numbers of hours worked.
Explain why it is not possible for an employee to be paid exactly £100 in a week. [1]

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(ii) Last week, Jo was paid just under £100.
What is the greatest whole number of hours that Jo could have worked? [1]

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.... hours

3. Place a tick (✓) in all the boxes that describe each number. [3]

	1	3	5	15	27
Prime Number					
Multiple of 3					
Factor of 30					

4. Jane is running a game in a school fete.
She is using six cards.
A whole number is written on each card.
The cards are turned face down and one is selected at random.
A player wins the game if an odd number is selected.

(a) Write a number on each card so that the chance of losing is the same as the chance of winning. [1]
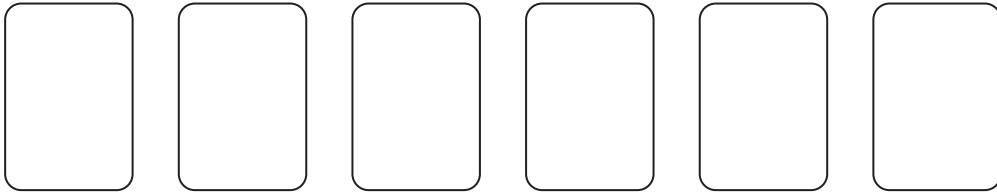
(b) Explain how Jane could change the numbers on the cards so that the chance of losing is greater than the chance of winning. [1]

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5. Niamh has made this solid shape from cubes.
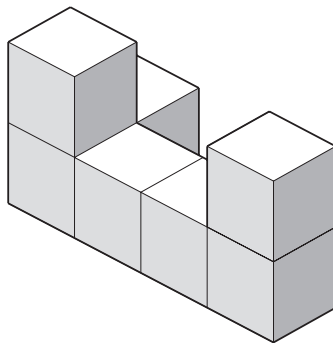
Which of the following diagrams shows the plan view of the solid shape?
Circle the correct answer. [1]

Turn over.
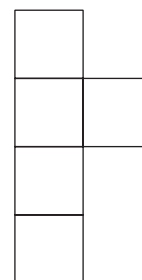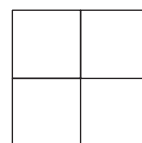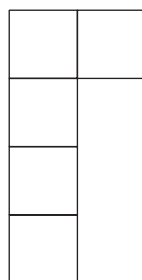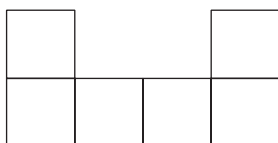
6. *(a)* Find the value of $\dfrac{\sqrt{2018}}{14}$.

Give your answer correct to 2 decimal places. [2]

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(b) What is the value of the 5 in the following number?

$$34 \cdot 256$$

Circle the correct answer. [1]

$\dfrac{5}{10}$ 50 $\dfrac{5}{100}$ $\dfrac{5}{1000}$ 5

7. Match each algebraic statement on the left with the correct description on the right. One has been completed for you. [1]

$5x \leqslant x + 3$ Expression

$T = 0.5h + 2$ Equation

$5x^2 + 2x - 1$ Inequality

$x^2 + 3x = 18$ Formula
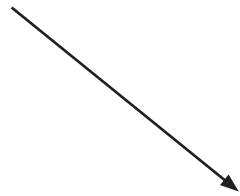
8. *(a)* Caitlin is thinking of a fraction.

- The numerator is the smallest positive even number.
- The denominator is the product of 4 and 1·25.

What fraction is Caitlin thinking of? [2]

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(b) Write the answer from *(a)* as a percentage. [1]

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9. The picture below shows 3 identical apples on a set of scales.
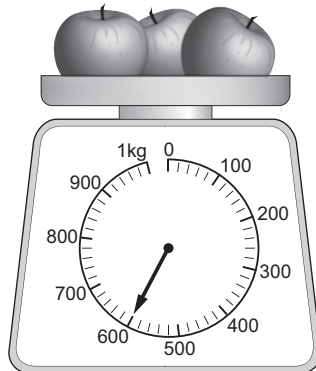
(a) What is the mass of **one** apple? [1]

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(b) 5 identical pears have the same total mass as the 3 apples.
What is the total mass of two apples and two pears? [3]

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10. *(a)* Simplify $4b + 2a + 3b + 3a - a$ [2]

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(b) Expand $3(x + 5)$ [1]

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(c) Sally has been given this question:

'Can $c^2 + 4c$ be simplified?'

She writes,

Yes, because $c^2 + 4c = 5c^2$.

Is Sally correct?   Yes ☐   No ☐

Explain your answer. [1]

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(d) Fabian is f years old.

(i) Fabian's brother, Ben, is half Fabian's age.

Write an expression for Ben's age. .... [1]

(ii) Write an expression to give Ben's age in five years time. [1]

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11. A car park has this sign by the ticket machine.

Up to 30 minutes	Free
Up to 1 hour	80p
Up to 2 hours	£1.70
Up to 4 hours	£2.50
Over 4 hours	£3

Accepts coins only.
Change is given.
Machine emptied daily.

At the end of a day there was exactly £60 in the machine.

(a) Rita says,

> There were 20 cars in the car park and they all stayed for over 4 hours.
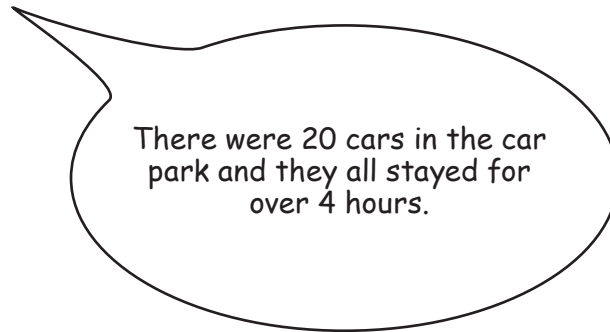
It is possible that Rita is correct.
Show how she worked this out. [1]

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(b) Find another possible way that the total in the machine could have been exactly £60. [2]

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12. Sarah is painting a wall with the dimensions shown below.
There is a door in the wall measuring 2 m by 1 m.
There are two square windows with sides of length 1·6 m.

7 m

3 m
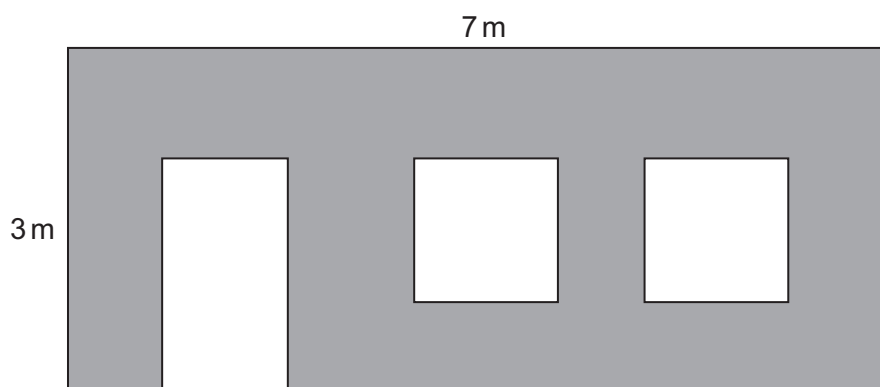
Diagram not drawn to scale

Each tin of paint can cover 6 m².
What is the smallest number of tins of paint that Sarah will need to paint the wall?
You must show all your working. [4]

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13. *(a)* Two triangles, A and B, are shown on the grid below.
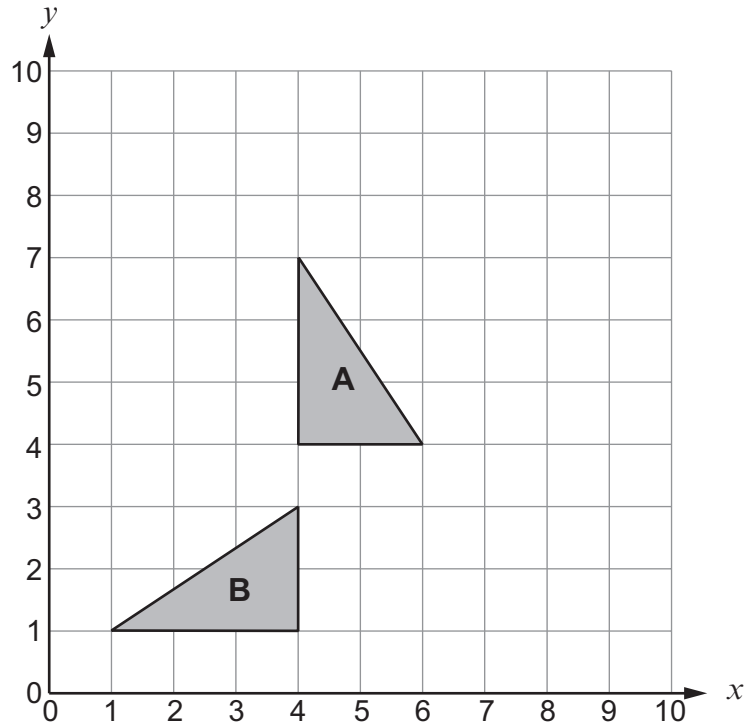
(i) Explain why triangle A and triangle B are congruent. [1]

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(ii) On the grid above, translate triangle A using the vector $\begin{pmatrix} 3 \\ -1 \end{pmatrix}$. [2]

(b) Triangle T is shown on the grid below.

(i) What type of triangle is T? [1]

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(ii) On the grid below, enlarge the triangle using scale factor 3. [2]

(C300U20-1) **Turn over.**

Examiner only
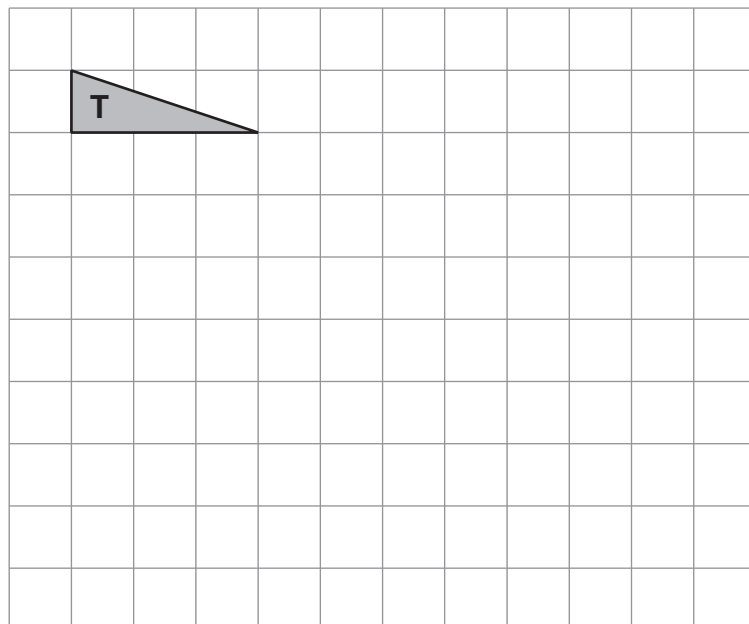
14. *(a)* The opening hours of a shop are shown below.

Monday	8:00 a.m. – 8:00 p.m.
Tuesday	8:00 a.m. – 8:00 p.m.
Wednesday	8:00 a.m. – 1:00 p.m.
Thursday	8:00 a.m. – 10:00 p.m.
Friday	8:00 a.m. – 8:00 p.m.
Saturday	9:00 a.m. – 5:00 p.m.
Sunday	10:00 a.m. – 4:00 p.m.

For how many hours is the shop open each week? [2]

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(b) A supermarket is open for 75 hours per week.

The opening hours are shown below.

Monday to Friday	8 a.m. – 8 p.m.
Saturday	9 a.m. – 6 p.m.
Sunday	10 a.m. – 4 p.m.

The supermarket manager is increasing the total opening hours by 10%.
The manager does not want to open earlier in the morning.
The hours on a Sunday cannot change.

(i)   Show how the manager could do this.   [3]

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Monday to Friday	8 a.m. – ....
Saturday	9 a.m. – ....
Sunday	10 a.m. – 4 p.m.

(ii)   The mean rate of pay for people working in the supermarket is £8.50 per hour.
There are 24 people who work at the supermarket.

•   With the new opening hours, what is the increase in the total weekly
wage bill for the supermarket?   [3]

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•   State one assumption you have made in calculating the increase
in the total weekly pay.   [1]

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•   How would your answer for the total weekly pay change if your
assumption was not correct?   [1]

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(C300U20-1)   **Turn over.**

C300U201
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15. This pie chart shows how 1200 students travel to school.

1200 students
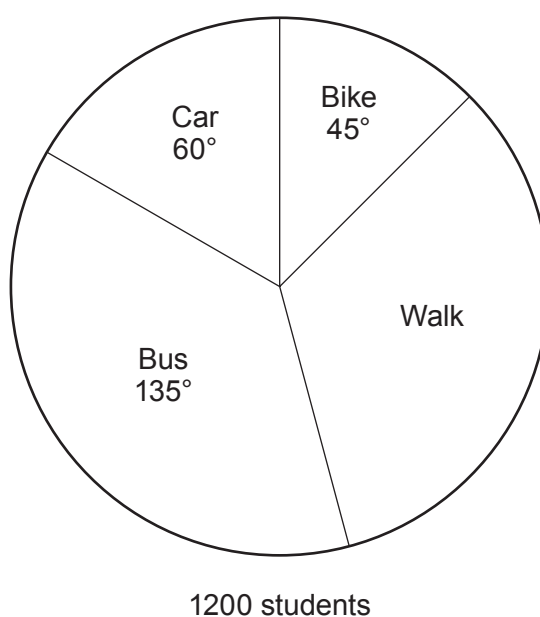
(a) (i) Calculate the **fraction** of students who walk to school. [2]

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(ii) Calculate the **number** of students who walk to school. [1]

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(b) (i) Draw a bar chart to show the **number** of students and how they travel to school. [4]

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(ii)   Give one advantage or disadvantage of the bar chart compared to the pie chart.

[1]

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Examiner only

16. *(a)* A company gives a bonus to Ian and Stacey in the ratio of the number of months they have worked for the company.

Ian has worked for the company for 245 months.
Stacey has worked for the company for 350 months.

(i) What is the ratio that will be used to share the bonus?
Give your answer in its simplest form. [1]

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(ii) The total bonus is £6970.

How much money would each of them receive? [3]

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Ian receives £ .... Stacey receives £ ....

(b) Bob, Jen and Lenny sell cars.
In one week, Bob sold 1 car, Jen sold 6 cars and Lenny sold 9 cars.
They shared the profit in the ratio of the number of cars they sold.
Lenny gave half of his share to Ellie.
What fraction of the profit was given to Ellie? [2]

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17. *Budget Buy*s sells two different sizes of tomato ketchup.

570 g

£1.85

700 g

£2.40

Which is the better value?

You must show all your working. [3]

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18. *(a)* Three points of a square have been plotted on the centimetre square grid below. Plot another point to complete the square. [1]
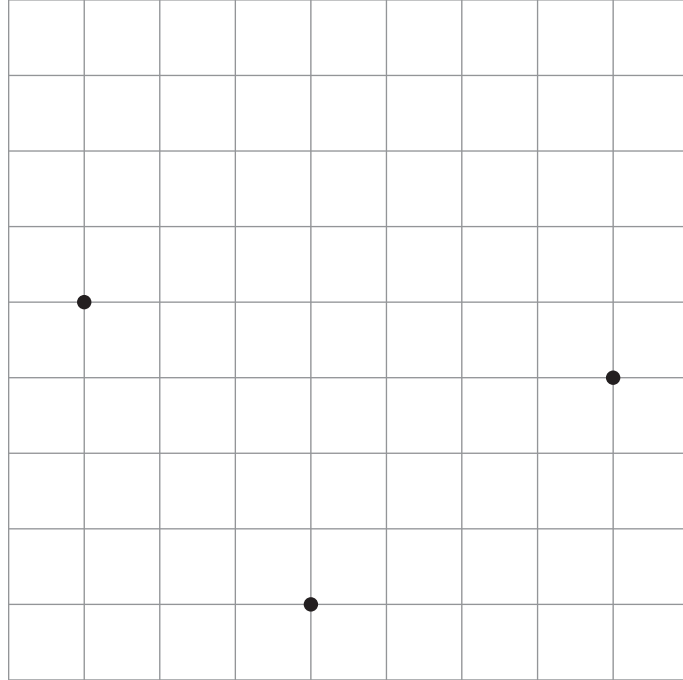
(b) A rectangle is shown on the grid below.
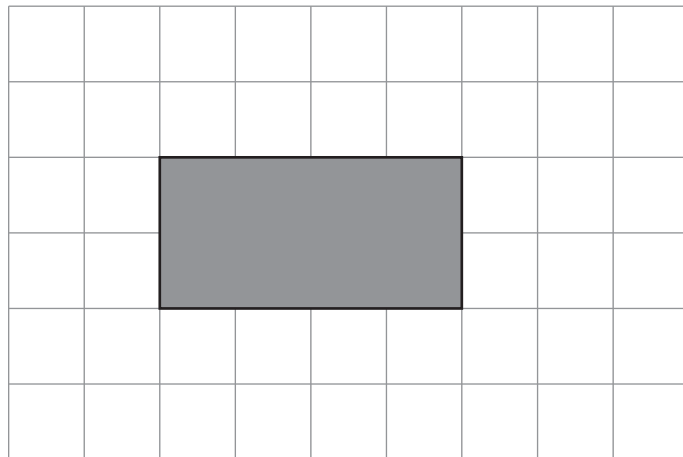
    (i) What is the order of rotational symmetry of the rectangle? [1]

    (ii) Add more squares to the rectangle to increase the order of rotational symmetry. [1]

19. *(a)* Calculate the area of the triangle. [2]

5·5 cm

8 cm
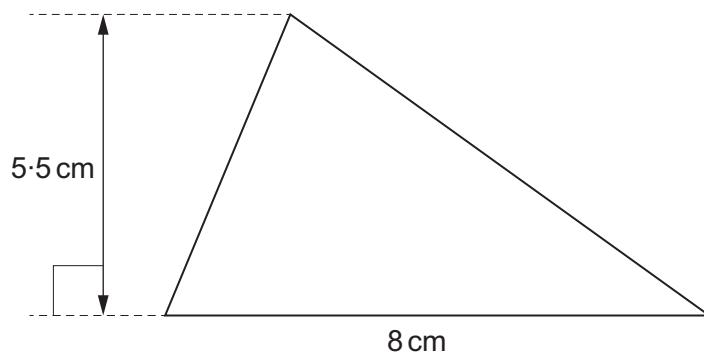
Diagram not drawn to scale

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(b) The triangle is the cross-section of the prism shown.

5·5 cm

4·5 cm

8 cm
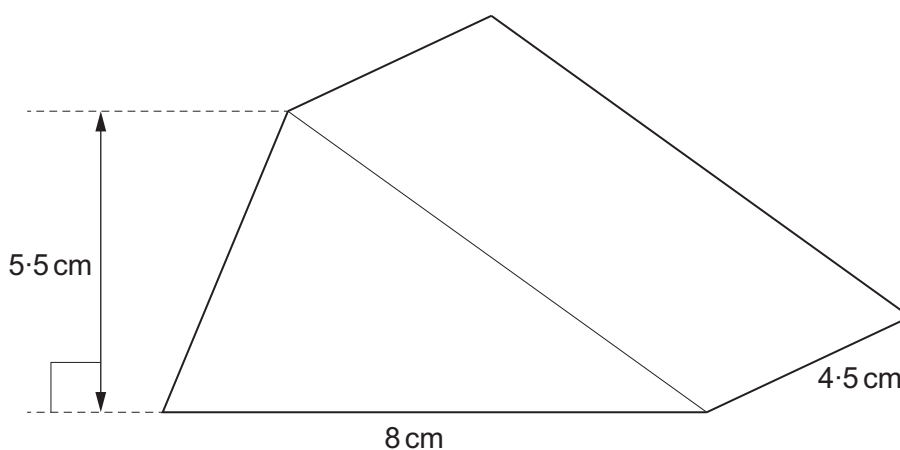
Diagram not drawn to scale

Calculate the volume of the prism. [1]

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(c) Another triangular prism has the same cross-section as the one in *(b)*.
The length of the prism is 50 mm.
Without finding the volume of this prism, explain why it has a greater volume than the prism in part *(b)*. [1]

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20. Tom is trying to increase £2480 by 8%.

This is Tom's work:

2480 × 0·8 = 1984
2480 + 1984 = 4464
Final answer = £4464

(a) Explain the error that he has made. [1]

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(b) What should Tom's answer have been?

Show all your working. [2]

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(c) Tom could have used a multiplier to work out the correct answer in one calculation.
Write the multiplier in the box below. [1]

2480 × [ ] = correct final answer

21. This is a recipe for a Christmas pudding.

Christmas Pudding

8 servings

110 g   butter

110 g   sugar

180 g   flour

4 tablespoons mincemeat

(a)   Alex needs to serve the pudding to 12 people.
Complete the recipe to serve 12 people.   [2]

Christmas Pudding

12 servings

........................g   butter

........................g   sugar

........................g   flour

.... tablespoons mincemeat

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(b)   Charles is also making Christmas pudding.
He checks his kitchen cupboard.
He only has 315 g of flour but he has plenty of everything else.
What is the greatest number of servings of pudding he can make?   [3]

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22. Sid has built the two walls, as shown in the diagram below.

12 m

7 m
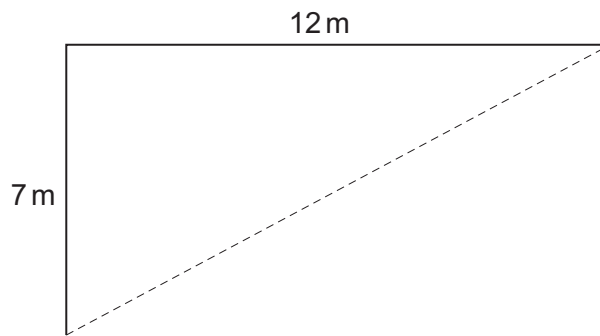
Diagram not drawn to scale.

Sid measures the distance shown by the dotted line.
He finds that it measures exactly 14 m.
Sid thinks that his two walls meet at right angles.
Is he correct?
Show all your working and explain your answer. [3]

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23. An amount of money is shared in the ratio 2 : 3 : 15.
The largest share is £330.
Calculate the smallest share. [2]

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Smallest share ....

24. The score from the two spinners shown is 2 + 5 = 7.
The score is the sum of the two outcomes.
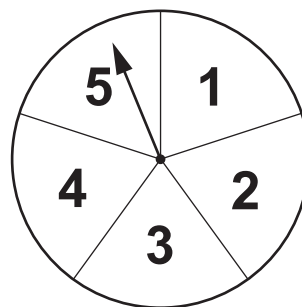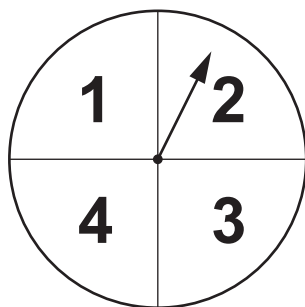
(a) What is the lowest possible score? [1]

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(b) Is it possible to get a score $\geqslant 9$?
Give a reason for your answer. [1]

Yes ☐   No ☐

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(c) Ryan says,

> You can score 5 with these spinners by getting 1 + 4 or 2 + 3,
> so the probability of scoring 5 is $\dfrac{2}{\text{the number of possible outcomes}}$

• Comment on Ryan's method.
• Find the probability of scoring 5.

Comment on Ryan's method: [3]

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Probability of scoring 5:

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Probability of scoring 5 is ....

25. Seb wants to travel around the world in 7 years' time.
In total, he will need £4000.

Seb has just been given £3000.
He invests this in an account that pays 2·5% interest per annum.

How much extra money will Seb need in 7 years' time?
Give your answer correct to the nearest pound.   [3]

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Extra money needed ....

26. The table shows the daily rainfall in Hightown during September 2017.

Rainfall, r mm	Number of days
$0 \leqslant r < 4$	4
$4 \leqslant r < 6$	14
$6 \leqslant r < 10$	10
$10 \leqslant r < 14$	2

(a) Calculate an estimate of the mean daily rainfall in Hightown for September 2017. [4]

(b) The actual mean daily rainfall in Seabank during September 2017 was 5·9 mm. Explain how it is possible that the actual mean daily rainfall in Hightown and Seabank were both the same for September 2017. [1]

27. *(a)* Solve $11x - 3 = 9x + 25$. [3]

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(b) Factorise $5x^2 + 10x$. [2]

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Examiner only

28. The table below gives the densities, in g/cm³, of aluminium, copper, iron and zinc.

Metal	Density g/cm³
Aluminium	2·70
Copper	8·96
Iron	7·87
Zinc	7·13

A metal sphere of radius 3·6 cm is placed on weighing scales.
The reading, in kg, shows:

1·538 kg

The sphere is made from a single metal.
Which metal is the sphere made from?
You must show all your working. [5]

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The sphere is made from ....

29. *(a)* The equations of 5 lines are given below.
Which one represents a line that is parallel to $3x + y + 4 = 0$?
Circle your answer.   [1]

$$3x - y - 4 = 0 \qquad\qquad y = 3x - 4$$

$$y = 3x + 4 \qquad\qquad y = 4 - 3x \qquad\qquad x + 3y + 4 = 0$$

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(b) A straight line has a gradient of 2 and passes through the point (0, 4).
Find the equation of this straight line.
Give your answer in the form $y = mx + c$.   [2]

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$y =$ ....

END OF PAPER

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For continuation only.