* WORKED SOLUTIONS *

Surname

Centre Number

Other Names

GCSE

C300U20-1





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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.

For Ex	aminer's us	se only
Question	Maximum Mark	Mark Awarded
1.	6	
2.	4	
3.	3	
4.	2	
5.	1	
6.	3	
7.	1	
8.	3	
9.	4	Ξ.
10.	6	
11.	3	
12.	4	
13.	6	-
14.	10	744
15.	8	0
16.	6	
17.	3	
18.	3	
19.	4	
20.	4	
21	5	
22	3	
23	2	
20.	5	
2.4.	2	
2J. 26	5	
20.	5	
21.	5	
20.	5	
29. Tedal	3	

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

Small tent £12 £75 Large tent £17.50 £110 Caravan £19.50 £115 Caravan £19.50 £115 Caravan £19.50 £115 Emma has a small tent. How much would it cost her to stay for <u>3 nights?</u> 12 × 3 = £36 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? 7.50 × 7 = £122.50 22.50 - 110 = £12.50 23.50 - 110 = £12.50 Bilal's family have a caravan. (i) Calculate the difference in cost between staying for 6 nights and staying for a weekled in the stay for 6 nights and staying for a weekled in the stay for 6 nights and staying for a weekled in the stay for 6 nights and staying for a weekled in the stay for 6 nights and staying for a weekled in the stay for 6 nights and staying for a weekled in the stay for 6 nights and staying for a weekled in the stay for 6 nights and staying for a weekled in the stay for 6 nights and staying for a weekled in the stay for 6 nights. 117 - 115 = £2 more to stay for 6 nights. 114 £2 cheaper (ii) Explain why they should pay for a week instead of 6 nights. 115 £2 cheaper			Cost per night	Cost per week
Large tent £17.50 £110 Caravan £19.50 £115 Caravan £19.50 £115 Emma has a small tent. How much would it cost her to stay for 3 nights? IQ X3 = £36 IQ X3 = £36 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? 7.50 X 7 = £1QQ.50 QQ.50 - 110 = £1Q.50 D Bilal's family have a caravan. (i) Calculate the difference in cost between staying for 6 nights and staying for a week 19.50 × 6 = £117 117 - 115 = £Q more to stay for 6 nights. 1ts £Q cheaper.		Small tent	£12	£75
Caravan£19.50£115)Emma has a small tent. How much would it cost her to stay for 3 nights? IQ X3 = \pounds 36)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?7.50 X 7 = \pounds IQ2.50 QQ.50 - 110 = \pounds IQ.50 cheaper)Bilal's family have a caravan. (i) Calculate the difference in cost between staying for 6 nights and staying for a week HOM much cheaper to stay for 6 nights.(i) Explain why they should pay for a week instead of 6 nights.(ii) Explain why they should pay for a week instead of 6 nights.		Large tent	£17.50	£110
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$19.50 \times 6 = E117$ $117 - 115 = E2 \text{more to stay for 6 night}$ $\text{than for a week instead of 6 nights.}$ Its E2 cheaper				
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(ii) Explain why they should pay for a week instead of 6 nights. Its EQ cheaper.) Bili (i) <u>1</u> <	al's family have a cara Calculate the differ $1 \cdot 50 \times 6 =$	avan. rence in cost between staying EII7	g for 6 nights and staying for a we
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1. The table below shows the rates for staying at a camping site.

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Turn over.

Examiner only

> C300U201 03

Examiner only A company uses the following formula to work out weekly pay. Pay = £7.50 × number of hours worked + £30 Terry worked for 28 hours last week. (a) How much was he paid? [2] + 30 = E240 / X (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] 100 - 30 = 7070 - 7.50 = 9 ۰З hours => not a whole number of hours (ii) Last week, Jo was paid just under £100. What is the greatest whole number of hours that Jo could have worked? [1] 9 hours

3. Place a tick (\checkmark) in all the boxes that describe each number.

2.

[3]

			L		
	1	3	5	15	27
Prime Number		/	\checkmark		
Multiple of 3		/		\checkmark	
Factor of 30	\checkmark	\checkmark			

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5 Examiner only 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] 3 odd/3 even Z L 0 (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] Change one of the add numbers 10 n even number 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] from above.

Turn over.

C300U201 05



[1]

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



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8.	 (a) Caitlin is thinking of a fraction. The numerator is the smallest positive even number. → 2 The demoninator is the product of 4 and 1.25. 4 × 1.25 = 5 	Examiner only
	What fraction is Caitlin thinking of?	[2]
	Q	
	5 //	
	(b) Write the answer from (a) as a percentage.	[1]
	$2 \times 100 = 40\%$	
	5	
9.	The picture below shows 3 identical apples on a set of scales.	C300U201
	(a) What is the mass of one apple?	[1]
	600 ÷ 3 = 200 g	
	(b) 5 identical pears have the same total mass as the 3 apples. What is the total mass of two apples and two pears? 5p = 600 p = 120g	[3]
	2(200) + 2(120) = 400 + 240 = 640g	······

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Turn over.

<i>(a)</i> Simplify 4	b + 2a + 3b + 3a - a 4a + 7b	[2]
(b) Expand 3	(x + 5) $3x + 15$	[1]
	oon given this question:	
(c) Cally has b	Con $a^2 \pm 4a$ be simplified?	
She writes	$can c^2 + 4c$ be simplified?	
	Yes because $c^2 + 4c = 5c^2$	
Is Sally cor	rrect? Yes No	
Explain you C^2 and a	ar answer. 2 are not 'like terms' so canno	[1]
be add	ed .	
(d) Fabian is f	years old.	
(i) Fabia Write	an's brother, Ben, is half Fabian's age.	[1]
(ii) Write	an expression to give Ben's age in five years time.	[1]

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C300U201 09

- 9
- 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 coin:	s only.
Change is g	iven.
Machine empti	ed daily.

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

Rita says, (a)

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] 60-20=E3 each which is the cost of each car if it parks for over 4 Find another possible way that the total in the machine could have been exactly £60. [2] (b) $24 \times E2.50 = E60$ 24 cars - Up to 4 hrs $75 \times 80p = E60$ 75 cars - Up to 1 hourOR other combination totalling £60 OR any

Examiner only 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 Im 1.6 m 1.6m 3 m 1.6m 1.6m 2m 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] Area of wall = 7×3 = 21m² Area of door = 2x1 = 2m² Area of windows = $2 \times (1.6 \times 1.6) = 5.12 \text{ m}^2$ Area of door+ windows = 2+5.12 = 7.12 m2 2 $21 - 7.12 = 13.88 \text{ m}^2$ Area to paunt = 13.88 ÷ 6 = 2.313 tins => Needs to buy 3



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Turn over.

12 Examiner only **14**. *(a)* The opening hours of a shop are shown below. open for (hrs) 12 Monday 8:00 a.m. - 8:00 p.m. Tuesday 12 8:00 a.m. - 8:00 p.m. 5 Wednesday 8:00 a.m. - 1:00 p.m. 14 Thursday 8:00 a.m. - 10:00 p.m. Friday 8:00 a.m. - 8:00 p.m. 12 S Saturday 9:00 a.m. - 5:00 p.m. Sunday 10:00 a.m. – 4:00 p.m. 6 For how many hours is the shop open each week? [2] hours // $\frac{12+12+5+14+12+8+6}{69} = 69$ (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.

eo

Show how the manager could do this. [3] (i) 7.5 10% × 75 1 hours ext 8am - 9pm Mon-Fri + hour : 1001S am - 8.30pm rs 8 a.m. Monday to Friday 9 a.m. -Saturday Sunday 10 a.m. - 4 p.m. The mean rate of pay for people working in the supermarket is £8.50 per hour. (ii) 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] 7.5 hours x 24 people x 28.50 = 21530 State one assumption you have made in calculating the increase in the total weekly pay. [1] All 24 womens do the extra hours and get pand the mean rate of pow How would your answer for the total weekly pay change if your assumption was not correct? [1] It could be higher if the get pould the mean or it could be lower if not all womers worked the extra hours

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Examiner only

> C300U201 13

Examiner only 15. This pie chart shows how 1200 students travel to school. Bike Car 45° 60° ø 120 Walk Bus 135° 1200 students (a) (i) Calculate the fraction of students who walk to school. [2] $135+60+45 = 240^{\circ}$ 360-240 = 120° 120 360 3 (ii) Calculate the number of students who walk to school. [1] $1 \times 1200 = 400$ (b) (i) Draw a bar chart to show the **number** of students and how they travel to school. [4] Bus: $135 \times 1200 = 450$ students 360 $ar: 60 \times 1200 = 20$ 2 360 Bike: 45 x 1200 150 360

14



Turn over.

	have worked for the company.	
	lan has worked for the company for <u>245 months.</u> Stacey has worked for the company for <u>350 months.</u>	
	 What is the ratio that will be used to share the bonus? Give your answer in its simplest form. 	[1]
	<u> </u>	
	245:350	
	-35/ 1-35	
	7:10	
	(ii) The total bonus is £6970.	
	How much money would each of them receive?	[3]
	I: S Total 1paf	
	7:10 17 6970 = 410	
	x410/ 1x410 17	
	2870:4100 E6970	
	lan receives £ 2870 Stacev receives £ 4100	
(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]
	B: J: L Total	
	1:6:9 16	
2	$1 \times 9 = 9$	
	2 16 27 11	

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17. Budget Buys sells two different sizes of tomato ketchup.

TOMATO KETCHUP TOMATO KETCHUP 570g 700g £2.40 £1.85 Which is the better value? [3] You must show all your working. Small 185 - 570 = 0.324...p 0 24 +00 arae 2 \circ P 0 bottle is better value 5 +

17

Turn over.

Examiner only

18. (a) Three points of a square have been plotted on the centimetre square grid below. Plot another point to complete the square.

(b) A rectangle is shown on the grid below.



Examiner only



Turn over.

Examiner only

[1]

[2]

[1]

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

This is Tom's work:

	2480 × 0·8 = 1984	
	2480 + 1984 = 4464	
	Final answer = £4464	
	See that the second	
(a)	Explain the error that he has made.	[1]
++	e multiplied by 0.8 = 80%	
. H	e should have multiplied by 0.08 (= 0,81	
		<i>.</i>
(b)	What should Tom's answer have been?	
	Show all your working.	[2]
	2480 × 0.08 = 198.4	
	2480 + 198.4 = 2678.4	

final answer = E2678.40

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



21. This is a recipe for a Christmas pudding.



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

Christmas	Pudding
12 serv	ings
165 g	butter
165 g	sugar
270g	flour
6 tablespoor	ns mincemeat

BII	$0 \times 1.5 = 165 q$	
6 11	$0 \times 1.5 = 165q$	
F) 18	$50 \times 1.5 = 270a$	
(MM) 2	$4 \times 1.5 = 6$	
(b)	Charles is also making Christmas pudding. He checks his kitchen cupboard. He only has 315g of flour but he has plenty of everything else.	[2]

What is the greatest humber of servings of pudding he can make?
315 ÷ 180 = 1.75
8 x 1.75 = 14 servings
J //

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Examiner only

[2]

Examiner only 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] $7^{2} + 12^{2} = 49 + 14$ 4 = 193 $14^2 = 196 \neq 193$ No Sid is not comect as if the U hiq nalos thadon q 2 2

$2 : 3 : 15 \qquad 1 \text{ paA}$ $x^{22} \downarrow \qquad 330 = f^{2} 2^{2}$ $E^{44}:E_{66}:F_{330} \qquad 15$ Smallest share E^{44}	Calci	late the smalle	est share.					[2]
$\frac{22}{E44} + \frac{330}{15} = \frac{22}{15}$		2	3	15		l	хA	
<u>E44.</u> , <u>E66.: £330</u> Smallest share <u>E.44</u>		x 22	1×22			330	=f22	
Smallest share <u>E.4.4</u>		E44;	E66 : E	330		15		
Smallest share <u>E.44</u>								
Smallest share <u>E.4.4</u>								
Smallest share <u>E.4.4</u>								
Smallest share <u>£44</u>								
Smallest share <u>£44</u>								
			Smalles	t share	44			
			Omaico		***** # ***** # *****			

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24.	The score from the two spinners shown is $2 + 5 = 7$. The score is the sum of the two outcomes.		Examiner only
	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		x
	(a) What is the <u>lowest</u> possible score?	[1]	ă.
	(b) Is it possible to get a score ≥ 9? Give a reason for your answer. Yes V No	[1]	
	4+5=9 So it is possible to score 9, but not		
	more than 9		
	(c) Ryan says,		
	You can score 5 with these spinners by getting 1 + 4 or 2 + 3, so the probability of scoring 5 is $\frac{2}{\text{the number of possible outcomes}}$		ж А
	 Comment on Ryan's method. Find the probability of scoring 5. 		
	Comment on Ryan's method:	[3]	
	There are more ways to score 5		
	So 4 ways autogether.		
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25 Examiner only Probability of scoring 5: Number of possible outrames = 4×5 = 20 Turn over. © WJEC CBAC Ltd. (C300U20-1)

Examiner only 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] 100.00 2.5% 102 2 3566.06 = E43 E434 Extra money needed

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Examiner only

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	Rainfall, r mm	Number of days
	$0 \leq r < 4$	4
	$4 \leq r < 6$	14
	6 <i>≤ r</i> < 10	10
	10 <i>≤ r</i> < 14	2
a) Calcula	te an estimate of the mean	an daily rainfall in Hightown for September 2017.
Midf	st Days	
2 '	x 4 =	8
5	× 14 = '	70
S	× 10 =	80
<u></u>	<u>× 0</u> -	<u>24</u>
12	× ~ ~	100
lota	<u>30</u> [182
me	an = <u>182</u> = 30	= 6 · 1 mm
) The <u>act</u> Explain Seabar	<u>ual mean daily rainfall in S</u> how it is possible that the k were both the same for	Seabank during September 2017 was 5.9mm. e actual mean daily rainfall in Hightown and r September 2017.
ce ha	ve estimated	id the mean in Highton
y us	ing the mid	spoint of each group,
' the	actual rai	intall was lover then
no m	ean in thig	htown could be less
nd -	thosefore th	ie same as seabank

Turn over.

27.	(a)	Solve $11x - 3 = 9x - 9x - 9x$	- 25.	[3]	only
		2x - 3 = 2 +3 +	5	 	
		2x = 2	.8	 	
			+ //		
	(b)	Factorise $5x^2 + 10x$. 5x(x)	+2)	 [2]	

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Examiner only Density g/cm³ Aluminium 2.70 8.96 7.87 7.13 A metal sphere of radius 3.6 cm is placed on weighing scales. 1.538 kg The sphere is made from a single metal. Which metal is the sphere made from? [5] 1533 Ξ

Mass = 1З Volume sp 11 Shere 3 З 1 З 1538 З ľγ Ξ cm 195.42 The sphere is made from

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

Metal

Copper

Iron

Zinc

The reading, in kg, shows:

You must show all your working.

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Turn over.

29

Examiner only 29. (a) The equations of 5 lines are given below. Which one represents a line that is parallel to 3x + y + 4 = 0? same gradient Circle your answer. [1] y = 3x - 43x - y - 4 = 0y = 3x + 4x + 3v + 4 = 0v = 4 - 3x \mathcal{O} (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 + mx[2]

END OF PAPER