

	Ce	entre in	umbe

Candidate Number

General Certificate of Secondary Education January 2014

Mathematics

Unit T2

(With calculator)

Foundation Tier





[GMT21]

GMT21

FRIDAY 10 JANUARY, 9.15 am-10.45 am

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page. You must answer the questions in the spaces provided. Do not write outside the box, around each page, on blank pages or tracing paper.

Complete in blue or black ink only. Do not write with a gel pen.

Answer all twenty-nine questions.

Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

You may use a calculator for this paper.

INFORMATION FOR CANDIDATES

The total mark for this paper is 100.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Functional Elements will be assessed in this paper.

Quality of written communication will be assessed in questions 1 and 16(b).

You should have a calculator, ruler, compasses and a protractor.

The Formula Sheet is on page 2.

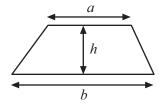


Formula Sheet

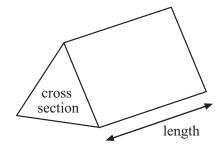
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Area of trapezium = $\frac{1}{2}(a+b)h$



Volume of prism = area of cross section \times length





Qu	ality	of writter	ı commu	nication	will be as	sessed in this question.		Examin Marks	er Only Remark
1	(a)	Work out	the value	of $2^2 \times 3$	3 ³ showing	each step of your working.			
						Answer	[2]		
	(L.)	3371 1 C	41 C. 11.	· · · · · · · ·			— [2]		
	(b)					arest in value to $\frac{1}{4}$?			
			$\frac{3}{20}$						
		Show clea	arly how	you rea	ch your an	iswer.			
						Answer	[2]	Total Qu	uestion 1
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2	(a) From the numbers in the list below	Examiner Only Marks Remark
	24 56 81 40 25 66 59 90 27	
	(i) write down a square number,	
	Answer[1]	
	(ii) write down a cube number.	
	Answer[1]	
	(b) Martha's grandmother's age on her next birthday will be both a square number and a cube number at the same time.	
	What age is Martha's grandmother now?	
	Answer[2]	Total Question 2
		Total Question 2
3	Anne bought pink and blue ribbon for her Nursery School.	
	She bought 3.2 metres of pink ribbon and 2.6 metres of blue ribbon and paid the shopkeeper £8.89	
	The pink ribbon cost £1.60 per metre.	
	How much did the blue ribbon cost per metre?	
	Show clearly how you worked out your answer.	
		Total Question 3
8691	Answer £ [4]	
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4	Year	2008	2009	2010	2011	2012		Examin Marks	er Only Remark
	Rainfall (cm)	60.5	62.5	62.0	61.0			Marks	Kemark
	The mean rainfa 2012?					ne rainfall in			
								Total Or	uestion 4
				Ansv	ver	cm	1[3]	Total Qt	icstron 4
5	The table below sold in a shop or		number of	pairs of sho	oes of differ	rent colours			
	Colour	Black	Brown	Blue	Other				
	Number	35	20	18	17				
	Angle								
	Draw a clearly leach colour.	abelled pie	chart to she	ow the nun	nber of pairs	s of shoes of	Î		
					\				
			•						
					/			Total O	
							[4]	Total Qt	uestion 5
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The two graphs below show similar information but look different. **Examiner Only** Marks Remark Graph A Graph B holiday sales holiday sales 52 70 50 60 holidays sold holidays sold 50 48 40 46 30 20 42 40 10 0 38 Feb Feb Mar Apr May June July Jan Mar Apr May June July Aug Month Month (a) Which graph appears to show the biggest increase in sales? Answer Graph ____ [1] **(b)** What causes this graph to be misleading? [1] Answer _ Total Question 6 8691

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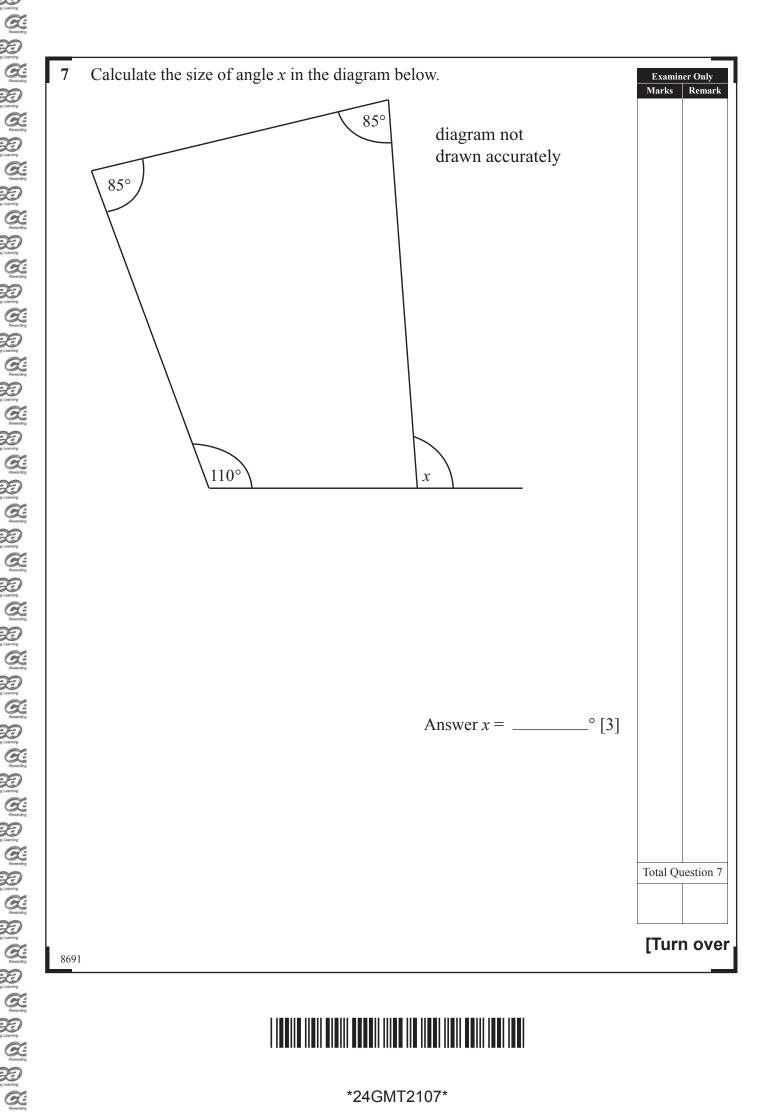
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Dublin Connolly		1000	1300	1600
Newry 🕒		1112	1412	1712
Poyntzpass		1	1	1
Scarva		1	1	1
Portadown	0845 0945 1045	<i>1134</i> 1145 1245 1345	<i>1434</i> 1445 1545 1645	17341745 1845
Lurgan	0851 0951 1051	<i>1144</i> 1151 1251 1351	I 1451 1551 1651	l 1751 1851
Moira	0857 0957 1057	l 1157 1257 1357	I 1457 1557 1657	l 1757 1857
Lisburn	0910 1010 1110	12031210 1310 1410	l 1510 1610 1710	1 1810 1910
Hilden	0912 1012 1112	1 1212 1312 1412	1 1512 1612 1712	1 1812 1912
Lambeg	0914 1014 1114	1 1214 1314 1414	1 1514 1614 1714	1814 1914
Derriaghy	0916 1016 1116	1 1216 1316 1416	1 1516 1616 1716	1 1816 1916
Dunmurry	0919 1019 1119	1 1219 1319 1419	1 1519 1619 1719	1819 1919
Finaghy	0922 1022 1122	1 1222 1322 1422	1 1522 1622 1722	1 1822 1922
Balmoral	0924 1024 1124	1 1224 1324 1424	1 1524 1624 1724	1 1824 1924
Adelaide	0926 1026 1126	l 1226 1326 1426	l 1526 1626 1726	1 1826 1926
Great Victoria Street	0930 1030 1130	1 1230 1330 1430	l 1530 1630 1730	1 1830 1930
Great Victoria Street	0834 0934 1034 1134	1 1234 1334 1434	l 1534 1634 1734	1 1834 1934
City Hospital	0837 0937 1037 1137	1 1237 1337 1437	l 1537 1637 1737	1837 1937
Botanic	0839 0939 1039 1139	1 1239 1339 1439	1 1539 1639 1739	1 1839 1939
Belfast Central M	0842 0942 1042 1142	12161242 1342 1442	15071542 1642 1742	18071842 1942
Belfast Central	0845 0945 1045 1145	1245 1345 1445	1545 1645 1745	1845 1945
Titanic Qtr (Bridge End)	0848 0948 1048 1148	1248 1348 1448	1548 1648 1748	1848 1948
Sydenham +	0851 0951 1051 1151	1251 1351 1451	1551 1651 1751	1851 1948
Holywood	0855 0955 1055 1155	1255 1355 1455	1555 1655 1755	1855 1955
Marino	0857 0957 1057 1157	1257 1357 1457	1557 1657 1757	1857 1957
Cultra	0859 0959 1059 1159	1259 1359 1459	1559 1659 1759	1859 1959
Seahill	0902 1002 1102 1202	1302 1402 1502	1602 1702 1802	1902 2002
Helen's Bay	0905 1005 1105 1205	1305 1405 1505	1605 1705 1805	1905 2005
Carnalea	0909 1009 1109 1209	1309 1409 1509	1609 1709 1809	1909 2009
Bangor West	0911 1011 1111 1211	1311 1411 1511	1611 1711 1811	1911 2011
Bangor	0916 1016 1116 1216	1316 1416 1516	1616 1716 1816	1916 2016

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(a) Sarah takes the 1134 train from Portadown to Belfast Central. How long should the journey take?

Answer _____ minutes [1]

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Examiner Only

Marks Remark



(b)	James is in Portadown. He has to be in Holywood by 5 pm. What is the latest train he could take from Portadown?	Examin Marks	er Only Remark
	Answer[1]		
(c)	Using this train service, but not starting in Portadown, Joshua made a journey which lasted exactly 2 hours 7 minutes. What is the earliest time his journey could have started?		
	Answer [1]		
		Total Qu	estion 8
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9	A rectangle measures 7.6 cm by 4.8 cm.	Examine Marks	er Only Remark
	Calculate	Marks	Remark
	(a) the area of this rectangle,		
	Answer [3]		
	Answer [3] (b) the perimeter of this rectangle.		
	(b) the perimeter of this rectangle.		
	Answer cm [1]		
		Total Qu	estion 9
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10	(a)	Simplif	ÿ		Examiner Only Marks Remark
			5x + 2y - 3x - 5y		
				Answer [2]	
	(b)	Solve			
			7x - 3 = 18		
				Answer $x = [2]$	
	(c)	Solve			
			$\frac{x}{20} = 2$		
				Answer $x = $ [1]	
					Total Question 10
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11 (a) Complete the table of values for the equation y = 3x + 5

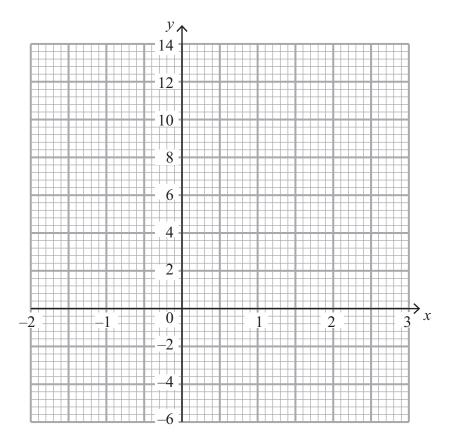
x	-2	-1	0	1	2	3
У	-1		5	8		14

[1]

Examiner Only

Marks Remark

(b) On the grid below, draw the graph of y = 3x + 5 between x = -2 and x = 3



[2]

(c) Draw the line x = 2 on the same grid.

[1]

Total Question 11



12	Hugh is a travelling salesman. He claims 24.6p for each km he travels and £27.60 for meals on each day he is travelling.	Examin Marks	er Only Remark
	If he travels more than 700 km in any week he adds 12.5% to his total claim.		
	Last week Hugh travelled 915 km in 5 days.		
	How much did Hugh claim for last week?		
	Show clearly how you arrived at your answer.		
		Total Ou	estion 12
	Answer £[5]	Total Qu	estion 12
13	(a) Write down two numbers which are square roots of 49		
	Answer and [1]		
	(b) Explain the meaning of $0.\dot{1}0\dot{3}$		
	Answer [1]	Total Qu	estion 13
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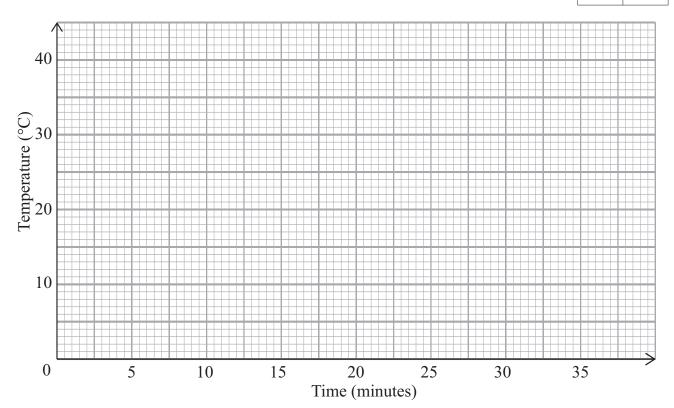
14 The table shows the temperature of some liquids as they cool in a freezer.

Time (minutes)	5	10	15	18	25	30	30
Temperature (°C)	35	31	24	22	12	7	6



(a) Draw a scatter graph for this data.





(b) Draw a line of best fit.

[1]

(c) Estimate the time taken for a liquid to reach freezing point (0 °C).

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Marks	Rema		

Answer _____ minutes [1]



	(4)	D 3.5.05	1 4h o	1	- 4: 0:0									
	(a)	Desci	ibe me	correl	auon.								Examin Marks	Remark
						Ans	wer					_ [1]		
						1 1115	VV C1					— [+J	Total Qu	estion 14
15	Twenty two pupils were asked to record the time (in minutes) they spent or their homework last Monday night. Their responses are listed below.							nt on						
	40 55	55 60	80 110	60 100	50 120		65 50	40 80	120 85	100 60	90 45			
	Cons	struct	a stem	and le	af diag	ram to	illustr	ate thi	s data.					
												[3]		
													Total Ou	estion 15
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Quality of written communication will be assessed in part (b) of this question.	Examiner Only Marks Rema	
16 (a) Calculate the size of the interior angle of a regular pentagon.		
Answer ° [2]		
(b) Three regular pentagons are placed together as shown below.		
diagram not drawn accurately		
Explain why you cannot cover a floor with regular pentagonal tiles.		
Answer		
[2]		
	Total Question	16

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17	The radius of the base of a cylindrical oil tank is 60 cm.	Examin Marks	er Only Remark
	(a) Calculate the area of the base of the oil tank.		
	Answer cm ² [2]		
	The height of the oil tank is 70 cm.		
	(b) Calculate the volume of the oil tank. Give your answer in litres .		
	Answer litres [3]		
		Total Qu	estion 17
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18	Angela buys 5 DVDs and 4 CDs. Each DVD costs <i>d</i> pounds. Each CD costs <i>c</i> pounds.	Examin Marks	ner Only Remark
	Write down an expression for the total cost.		
		Total Qu	estion 18
	Answer [2]		
19	The n^{th} term of a sequence is given by $n^2 - 1$		
	(a) Write down the first 3 terms of this sequence.		
	Answer,		
	(b) Explain why 101 cannot be a term in this sequence.		
	(b) Explain why 101 camot be a term in this sequence.		
	Answer[1]		
		Total Qu	estion 19
20	Solve $7e + 3 = 4e + 5$		
		Total Qu	estion 20
	Answer $e = $ [3]		
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21		Answer [3] Find the Lowest Common Multiple (LCM) of 63 and 84	Examin Marks	er Only Remark
22	The	Answer[2] weight of a cow increases from 147 kg to 165 kg.	Total Que	estion 21
		at is the percentage increase in the weight of the cow? Answer	Total Qu	
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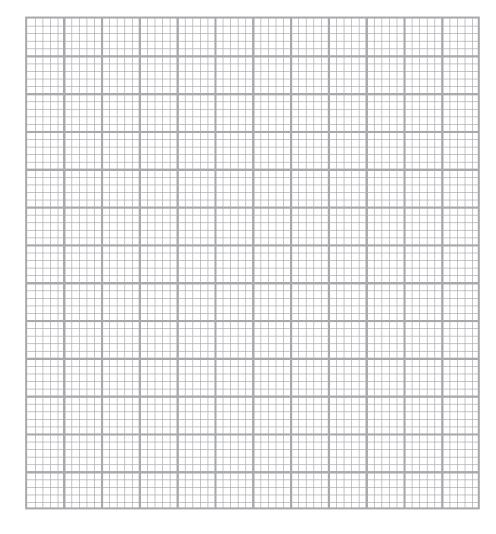
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23 The table below shows the weights of fish caught in a competition.

Weight (g)	Frequency
$0 < w \le 150$	10
$150 < w \le 300$	25
$300 < w \le 450$	18
$450 < w \le 600$	12
$600 < w \le 750$	10
$750 < w \le 900$	5

Draw a frequency polygon for this data.



[3]

Total Question 23

Examiner Only Marks Remark



24	gene	udent wishes to carry out a survey relating to television viewing by the ral public. first question is	ne	Examin Marks	er Only Remark
	("What age are you?" Answer			
	(a)	Give one criticism of this question.			
	-		[1]		
		Design a more suitable question with appropriate response boxes for her to record the age of those being surveyed.			
			[2]	Total Que	estion 24
			[2]		
25		first five terms of a sequence are 9, 13, 17, 21, 25 an expression, in terms of n , for the n th term of this sequence.			
				Tatal Ox	antian 25
				Total Que	estion 25
8691		Answer	[2]	[Turr	over



26	A glass window is in the shape of a semi-circle with diameter 40 cm.	Examin Marks	er Only Remark
	Calculate the perimeter of the semi-circle.	Marks	Remark
	diagram not drawn accurately		
	Answer cm [3]	Total Que	estion 26
27	The sketch shows a field which is in the shape of a right-angled triangle. The side $PQ = 10 \text{m}$ and the side $QR = 26 \text{m}$.		
	Calculate the length of the side PR.		
	Q diagram not drawn accurately 10 m		
	P R		
		Total Que	estion 27
8691	Answer m [3]		

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28 Expand and simplify	3(2w-1)-2(w-4)	Examir Marks	ner Only Remark
	Answer [2]		
		Total Qu	iestion 28
29 Use the method of trial a	nd improvement to find the solution to the		
equation $x^3 + 3x = 47$ Give your answer correct			
Show all your working.	, ve i decima piace.		
	Answer $x = $ [4]		
	[1]		iestion 29
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Question	Marks		
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