New Specification

Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
January 2012

Mathematics

Unit T2
(With calculator)
Foundation Tier

[GMT21]

WEDNESDAY 11 JANUARY

9.15 am–10.45 am

GMT21

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
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17	
18	
19	
20	
21	
22	
Total Marks	

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

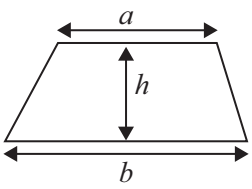
Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all twenty-two** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.
You **may** use a calculator for this paper.

INFORMATION FOR CANDIDATES

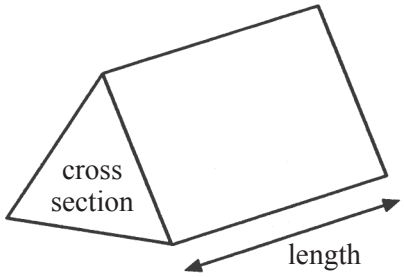
The total mark for this paper is 100.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Functional Elements will be assessed in this paper.
Quality of written communication will be assessed in **question 10**.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is overleaf.

Formula Sheet

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



Volume of prism = area of cross section × length

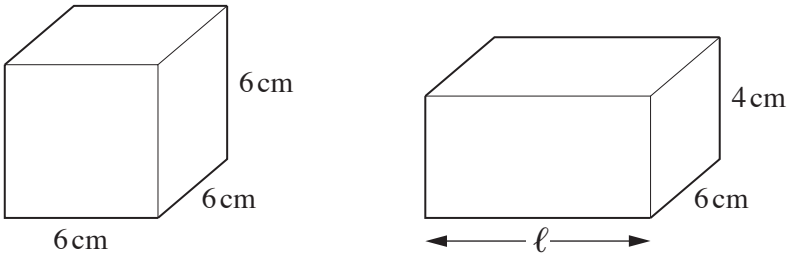


Answer **all** questions.

Examiner Only	
Marks	Remark

1 The volumes of this cube and this cuboid are the same.

What is the missing length marked ℓ on the cuboid?



Answer _____ [3]

Examiner Only	
Marks	Remark

2 **(a)** Each student in Year 10 studies one language (French, Spanish or German).

There are 135 students in Year 10.

Two-fifths study French, one-third study Spanish and the rest study German.

How many students study German?

Answer _____ [4]

(b) Below is a portion of Miss Johnston's bank statement for September.

Account Summary
Opening Balance £1224.08
Monthly Overdraft Limit £500.00

Miss Johnston
1st September–30th September

Account details

DATE	PAYMENT DETAILS	OUT	IN	BALANCE
02 Sept	Balance forward			1224.08
04 Sept	Southford BS	1013.27		_____
11 Sept	Travelwide Ins.	134.28		76.53
23 Sept	Carcomp. Finance	253.68		_____
27 Sept	Cheque Lodge.		52.00	_____

(i) Complete **all** the blank spaces on the statement. [3]

(ii) How much more could Miss Johnston have spent in September, without exceeding her overdraft limit?

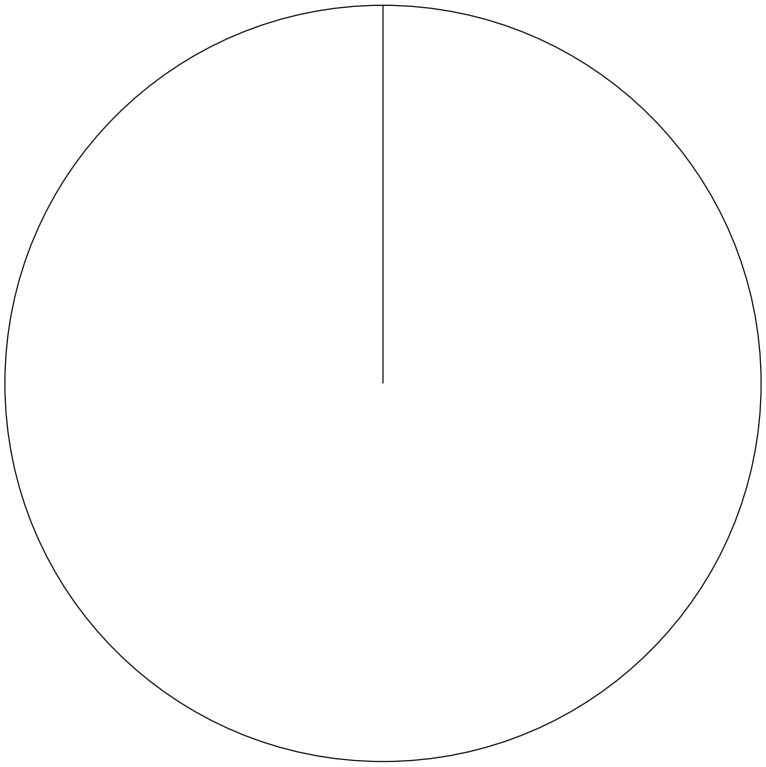
Answer £ _____ [1]

3 A travel agency recorded the types of holiday which were booked on a particular week.

The table below shows the results.

Type of Holiday	Frequency	Degrees
Bed & Breakfast	20	
Hotel half-board	22	
Self-catering	6	
Camping	12	

Complete an accurate pie chart below to show this information.



[4]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

4 120 Year 13 students each study one science.

The table below shows some information about these students.

	Biology	**Chemistry**	**Physics**	**Total**
Female	27			68
Male			29	
Total		31	48	120

Complete the table. [2]

5 **(a)** Solve the equations

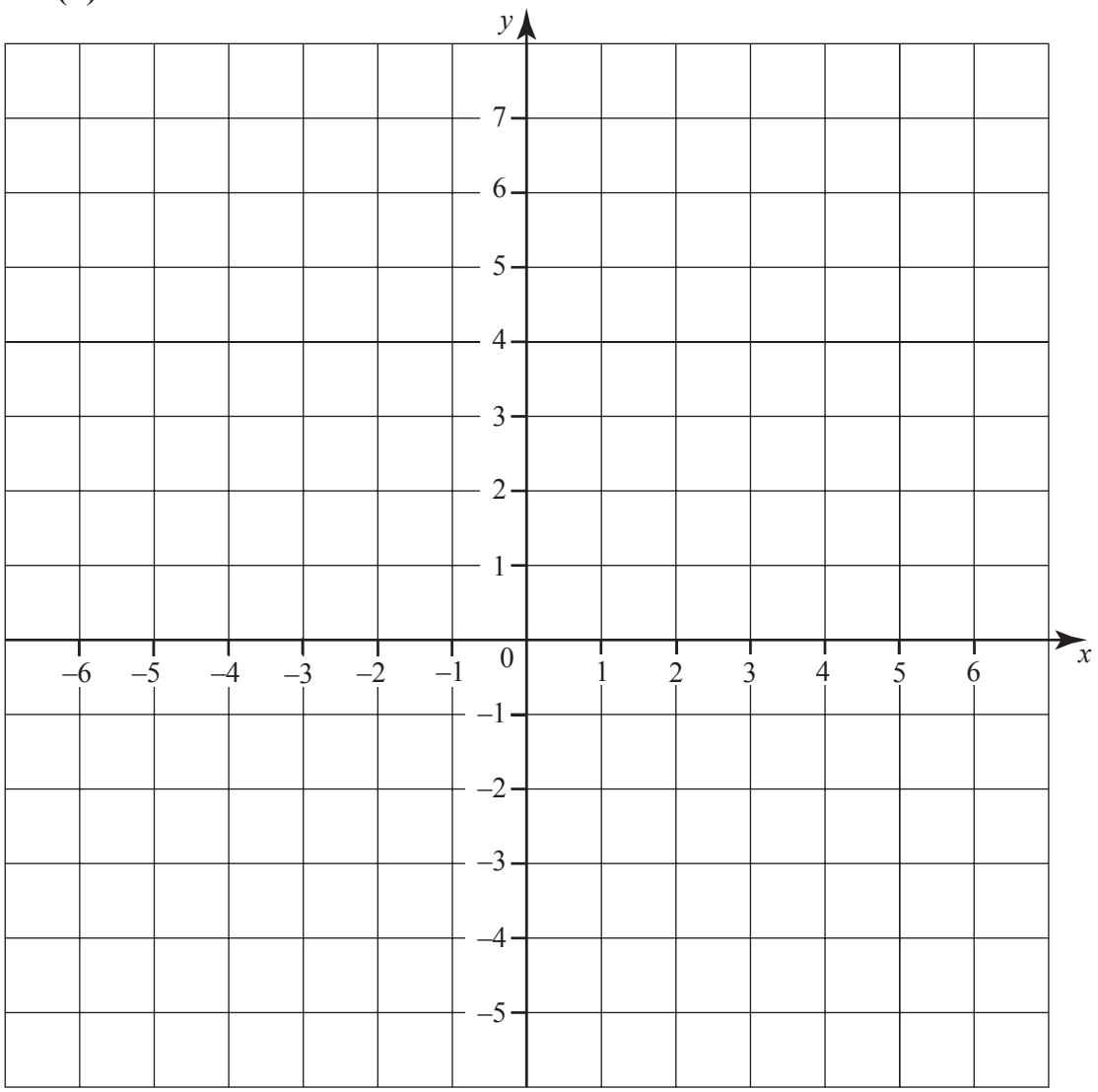
(i) $9x - 5 = 58$

Answer $x =$ _____ [2]

(ii) $\frac{x}{8} = 3$

Answer $x =$ _____ [1]

(b)



Draw the line $x = 5$ on the grid above. [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

6 A group of students take class tests in both English and Mathematics.

Each test is marked out of 50.

The stem and leaf diagrams below show the distribution of marks for both tests.

	English
0	
1	2 5 6 9
2	3 6 7 7 8
3	0 2 4 5 5
4	1 2 2 3 6
5	0

	Mathematics
0	9
1	0 1 2 6 7
2	1 3 4 5 7 8 8
3	2 5 7 9
4	1 4 8
5	

Key: 2 | 5 means 25

(a) Which subject has the bigger range of marks and by how much?

Answer _____ has the bigger range by _____ [2]

(b) Which subject has the bigger median mark and by how much?

Answer _____ has the bigger median mark by_____ [2]

---

7 **(a)** In the spaces provided, write down the next two numbers in the sequence

18, 17, 14, 9, _____, _____ [2]

(b) Simplify $6x + 3y - 2x + 2y$

Answer _____ [2]

(c) Factorise $20d + 35$

Answer _____ [1]

Examiner Only	
Marks	Remark

8 **(a)** Which of the following fractions is nearest in size to $\frac{3}{5}$?

Show your working.

$\frac{7}{10}$ $\frac{11}{20}$ $\frac{17}{30}$ $\frac{1}{2}$

Answer _____ [2]

(b) Calculate

(i) $\frac{1}{2.5^2}$

Give your answer as a **decimal**.

Answer _____ [2]

(ii) $\frac{6.5 \times 5.8}{5.3 + 2.1}$

Give your answer correct to 2 decimal places.

Answer _____ [2]

Examiner Only	
Marks	Remark

9 **(a)** Calculate the size of angle a.

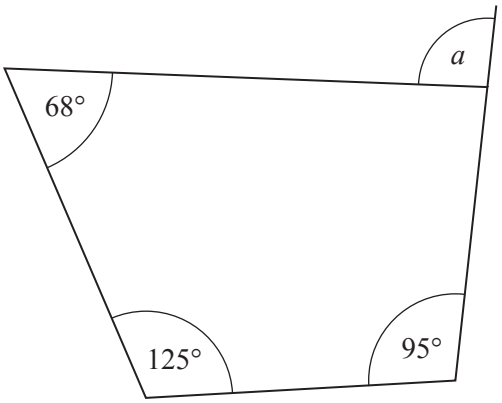


Diagram not drawn accurately

Answer a = _____° [3]

(b) A square just touches an equilateral triangle as shown.

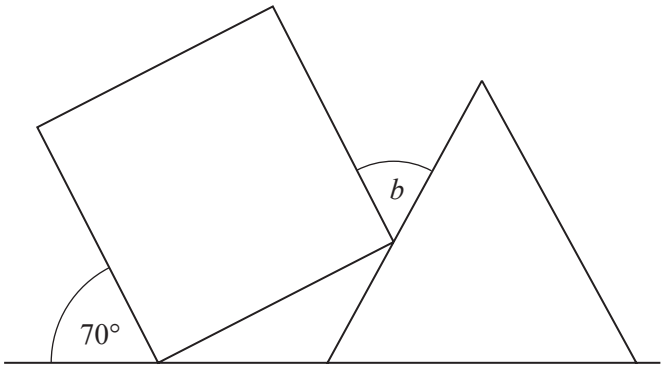


Diagram not drawn accurately

Calculate the size of angle b.

Answer b = _____° [3]

(c) AB is parallel to CD. EF is a straight line. BC = BD. Angle ABC = 42°

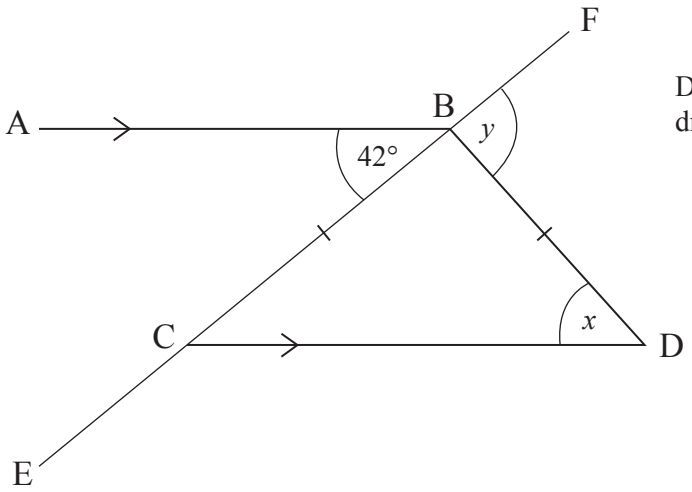


Diagram not drawn accurately

(i) Calculate the size of angle x.

Answer x = _____° [1]

(ii) Calculate the size of angle y.

Answer y = _____° [2]

Examiner Only	
Marks	Remark

Quality of written communication will be assessed in this question.

Examiner Only	
Marks	Remark

10 Aaron wants to find out how often people go to the cinema.
He designs the following questionnaire to use to gather data for his survey.

> How often do you go to the cinema?
>
> Tick one box below.
>
> Not very often ☐ Sometimes ☐ A lot ☐

(a) Write down two things that are wrong with this questionnaire.

1. _____

_____

2. _____

_____ [2]

(b) Design a better questionnaire for him to use to find out how often people go to the cinema.
You should include some response boxes.

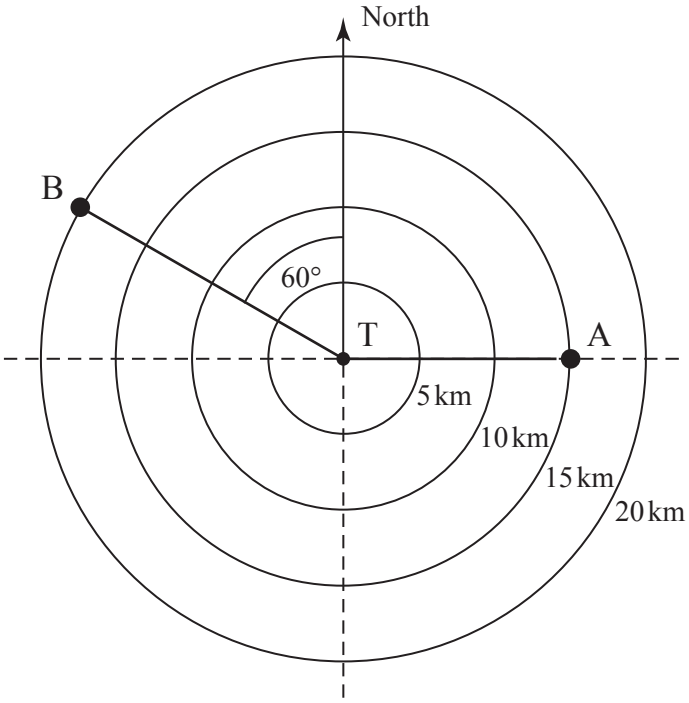
[2]

(c) Aaron intends to give out his questionnaire to all the men leaving the cinema.
Give two reasons why the data he will collect from his survey will be biased.

1. _____

2. _____ [2]

11 A radar screen shows the position of mountain rescue teams at the centre T and two climbers who need help at positions A and B.



Complete the following sentences:

(a) To help climber A a rescue team must travel

_____ km on a bearing of _____°. [1]

(b) To help climber B a second rescue team must travel

_____ km on a bearing of _____°. [1]

(c) Another climber C needs help at a distance of 12.5 km from T on a bearing of 210°. Mark the position of climber C on the diagram. [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

12 **(a)** In April last year, it rained on 24 days.

What percentage of days in April were dry?

Answer _____% [2]

(b) A wealthy American has $300 000 to spend on a holiday villa in Spain.

The exchange rates are shown below:

£1 = 1.1752 euro	£1 = $1.5669

She sees a villa priced at 240 000 euro.

Has she enough money to buy the villa?

Show working to explain your answer.

Answer _____

_____ [3]

13 **(a)** Work out the value of x in the quadrilateral below.

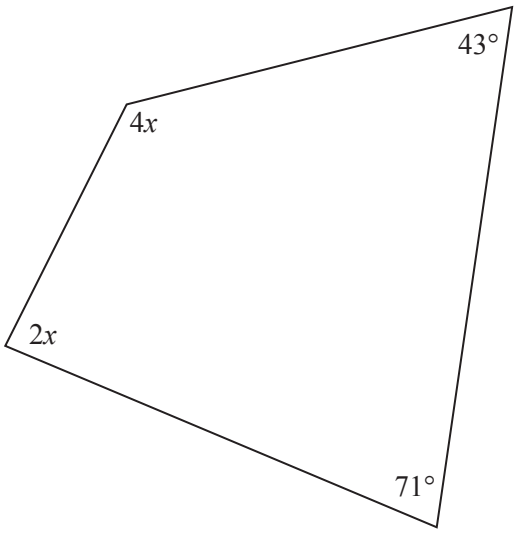


Diagram not drawn accurately

Answer x = _____° [4]

(b) A minibus can carry 10 passengers and a car can carry 4 passengers.

Write down an expression for the **total** number of passengers that can be carried in x minibuses and y cars.

Answer _____ [2]

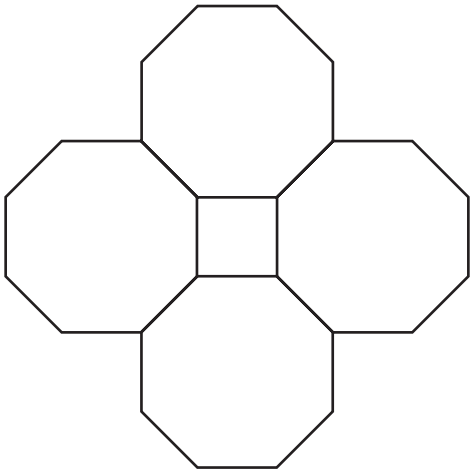
Examiner Only

Marks	Remark

14 **(a)** Calculate the size of the interior angle of a regular octagon.

Answer _____° [2]

(b) Four floor tiles, each in the shape of a regular octagon are placed together as shown. Explain why the shape between them must be a square.



Answer _____

_____ [2]

Examiner Only	
Marks	Remark

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(Questions continue overleaf)

15 The table shows information about the number of pages (P) that 100 children printed from a computer last week.

Number of pages	Frequency
$0 < P \leq 3$	10
$3 < P \leq 6$	19
$6 < P \leq 9$	23
$9 < P \leq 12$	32
$12 < P \leq 15$	10
$15 < P \leq 18$	6

(a) What is the modal class?

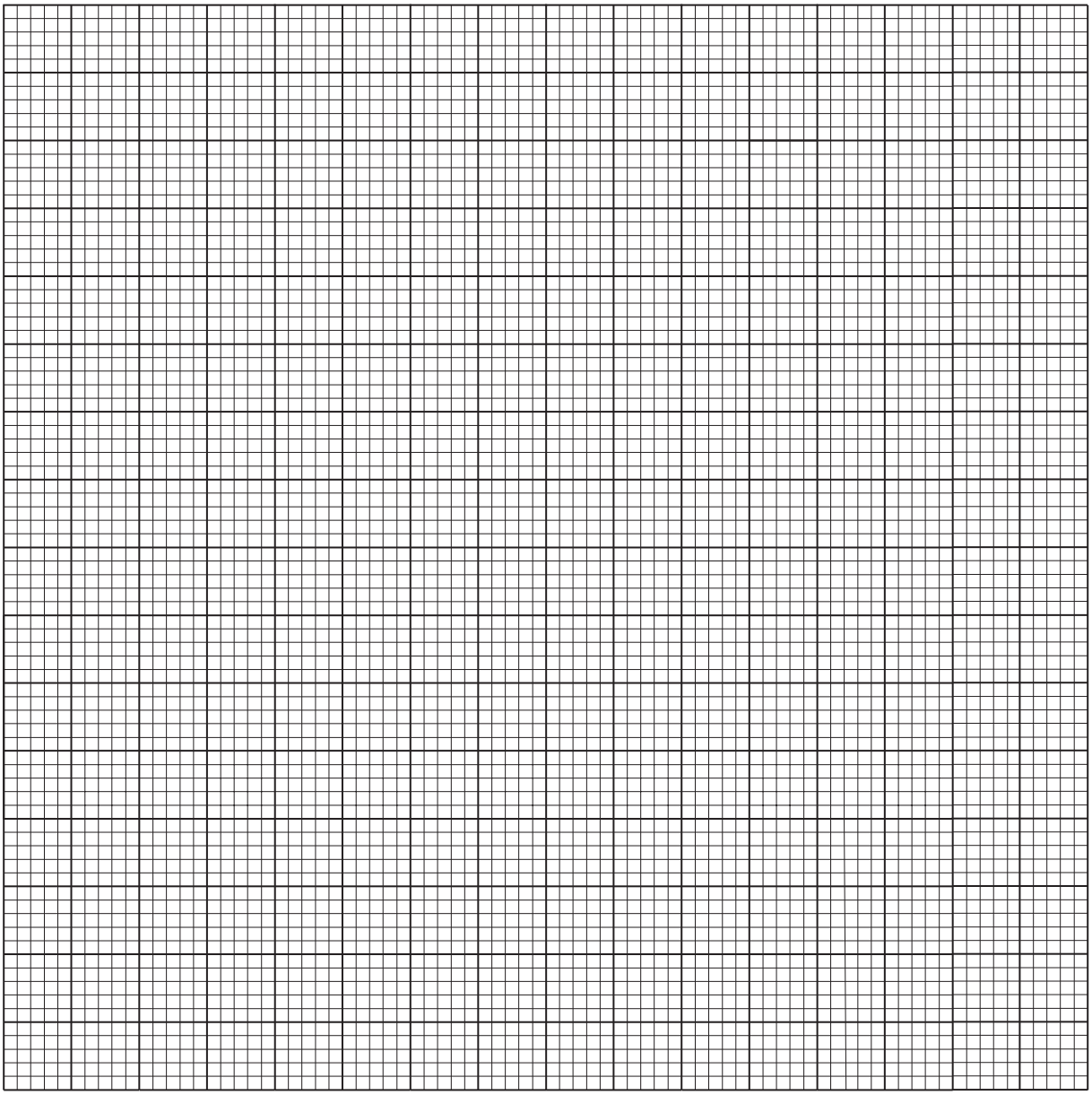
Answer _____ [1]

(b) What class interval contains the median?

Answer _____ [1]

Examiner Only	
Marks	Remark

(c) On the grid below draw a frequency polygon to illustrate the data opposite.



[2]

Examiner Only	
Marks	Remark

16 **(a)** Write 24 as a product of prime factors.

Answer _____ [2]

(b) Hence or otherwise find the lowest common multiple (LCM) of 24 and 30.

Answer _____ [2]

(c) What is the smallest whole number 24 could be multiplied by to make a square number?

Answer _____ [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

17 **(a)** Find the midpoint of the line joining the points $(-5, 1)$ and $(3, -5)$

Answer _____ [2]

(b) Calculate the length of the line joining the points $(-2, -2)$ and $(3, 10)$

Answer _____ [3]

---

18 Expand and simplify $7(2a + 3) + 3(4a - 2)$.

Answer _____ [2]

---

19 Kyle bought 6 pears at x pence each and 3 tins of meat at $4x$ pence each.
He got £4.24 change from £10

Write down an equation in terms of x and solve it to find the value of x.

Answer $x =$ _____ [4]

Examiner Only	
Marks	Remark

20 From a large bottle containing $2\frac{1}{2}$ litres of lemonade, a girl pours four full glasses each holding $\frac{2}{5}$ litre.

How many **more** full glasses can she pour before running short of lemonade?

Answer _____ [3]

---

21 A solution to the equation $x^3 - 5x = 27$ lies between 3 and 4.

Use trial and improvement to find this solution.

Give your answer correct to 1 decimal place.

Show each stage of your working.

Answer $x =$ _____ [3]

22 The mean test score for a class of 20 pupils was 15.

Some scores are shown below.

Score	Frequency	
18	4	
16	11	
12	3	
	2	

Calculate the missing score.

Answer _____ [3]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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