cea
Rewarding Learning

General Certificate of Secondary Education
January 2017

Mathematics

Unit T2
(With calculator)
Foundation Tier

[GMT21]   *GMT21*
MONDAY 9 JANUARY, 9.15am–10.45am

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 boxed area on each page, on blank pages or tracing paper.
Complete in black ink only. **Do not write with a gel pen.**
Answer **all twenty-eight** questions.
All working should be clearly shown in the spaces provided. 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 **13** and **25**.
You should have a calculator, ruler, compasses and a protractor.
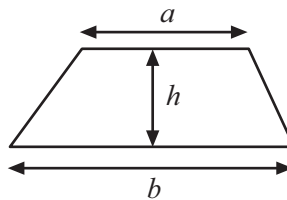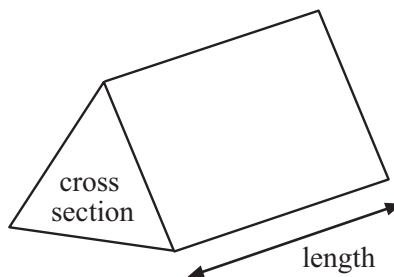The Formula Sheet is on page 2.

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32GMT2101

Formula Sheet

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

$$a$$

$$h$$

$$b$$

Volume of prism = area of cross section × length

cross
section

length

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(Questions start overleaf)

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32GMT2103

1

| 2 | 8 | 9 | 15 | 17 | 24 | 27 | 30 | 36 | 51 |

Which of the above numbers are

(a) cube numbers, Answer _____ [2]

(b) prime numbers? Answer _____ [2]

2 Write down the two missing numbers in this sequence.

1, 3, 6, 10, 15, _____ , 28, _____ [2]

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3   In Mary's shop the total cost of 1.7 kg of bananas and 0.4 kg of pears is £2.32
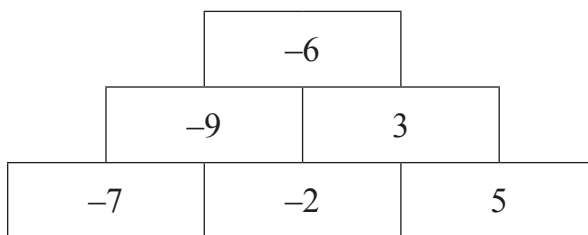
Bananas cost £0.80 per kg.
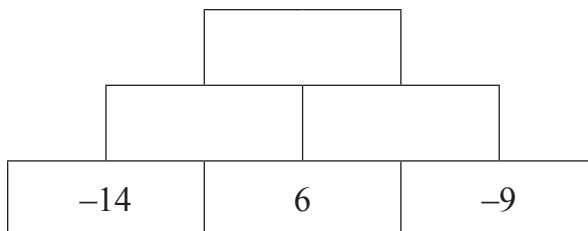
How much do pears cost per kg?

Answer £ _____ [4]

[Turn over

4 **(a)** Here is an example of a mathematical pyramid.

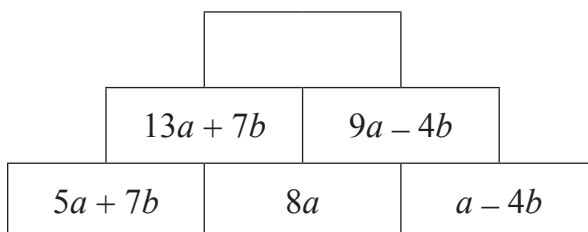To find the number in each box you **add** the two numbers in the boxes beneath it.

	−6	
−9		3

−7	−2	5

(i) Complete the following pyramid in the same way.

−14	6	−9

[2]

(ii) Here is an algebraic pyramid. Complete the top box of this pyramid.

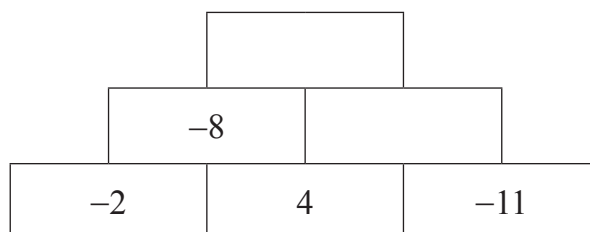|		
$13a + 7b$		$9a - 4b$

$5a + 7b$	$8a$	$a - 4b$

[2]

(b) Here is a different type of pyramid.

To find the number in each box you **multiply** the two numbers in the boxes beneath it.

Complete the pyramid.

−8	

−2	4	−11

[2]

[Turn over

5   Work out the value of $5x + 3y$ when $x = -4$ and $y = 2$

Answer _____ [2]

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6 **(a)** Complete the table for $y = 6 - 2x$

x	-1	0	1	2	3	4
$y = 6 - 2x$	8	6	4		0	

[2]

(b) Using the values from the table, draw the graph of $y = 6 - 2x$
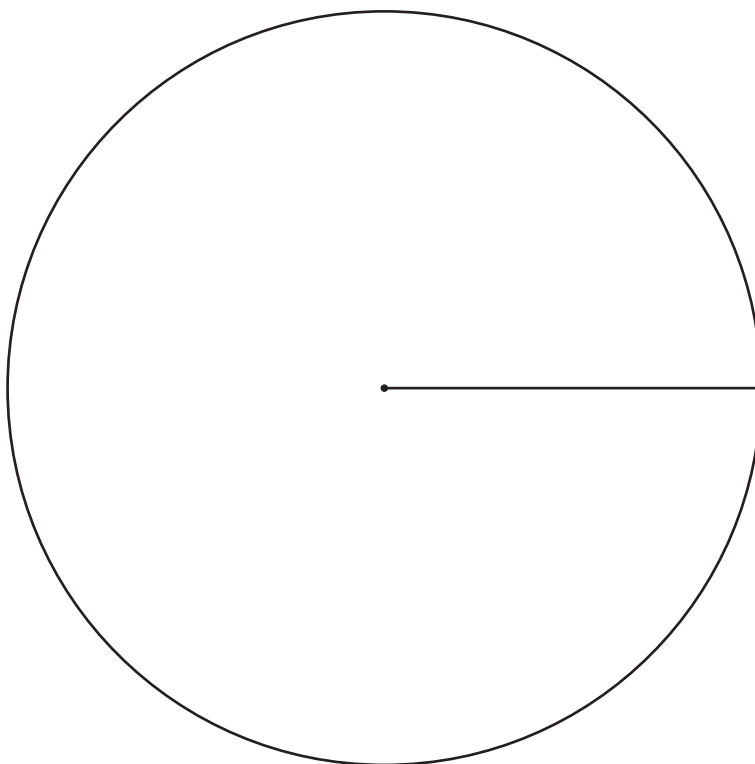

[1]

[Turn over

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32GMT2109
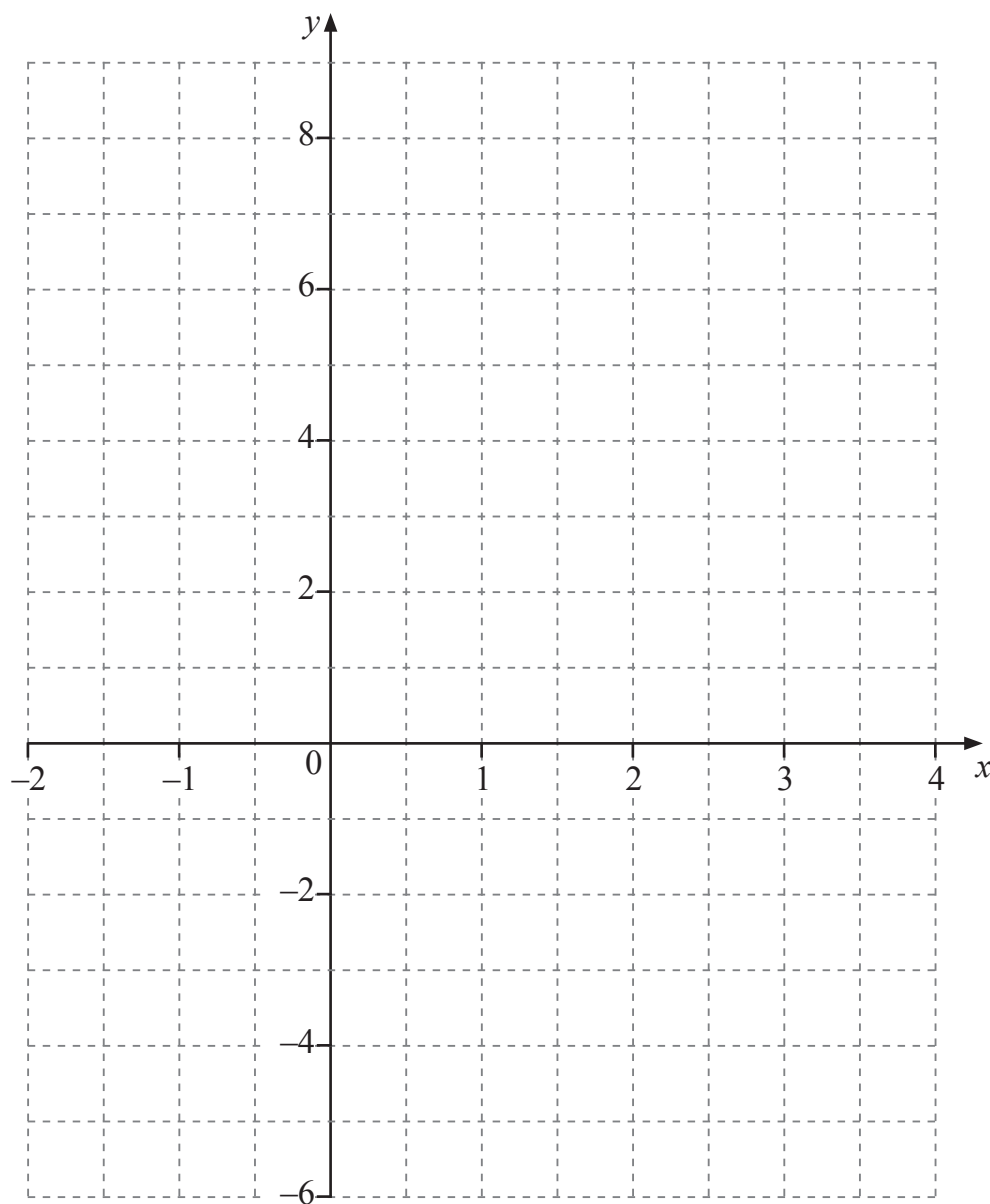
7 Ella recorded how many of each flavour of ice-cream were sold in her shop one day.

Ice-cream Flavour	Number	Angle
Strawberry	48	
Vanilla	31	
Chocolate	29	
Mint	12	

Draw a clearly labelled pie chart to show this information.

[4]

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8 The stem and leaf diagram shows the weights of some coins.

```
3 | 4 6                    Key  3 | 4 = 3.4 g
4 | 0 5 7 9
5 | 1 2 4 6 8
6 | 1 3 4 5 7 8 9
7 | 0 5 5 5 7 9
8 | 1 1 2 4 6
9 | 2 3
```

Write down

(a) the range,

Answer _____ g [1]

(b) the mode,

Answer _____ g [1]

(c) the median.

Answer _____ g [1]

[Turn over

32GMT2111

9

Number in

Is the number odd?

Yes

Is the number a multiple of 9?

Yes

No

No

Box R

Box S

Box T
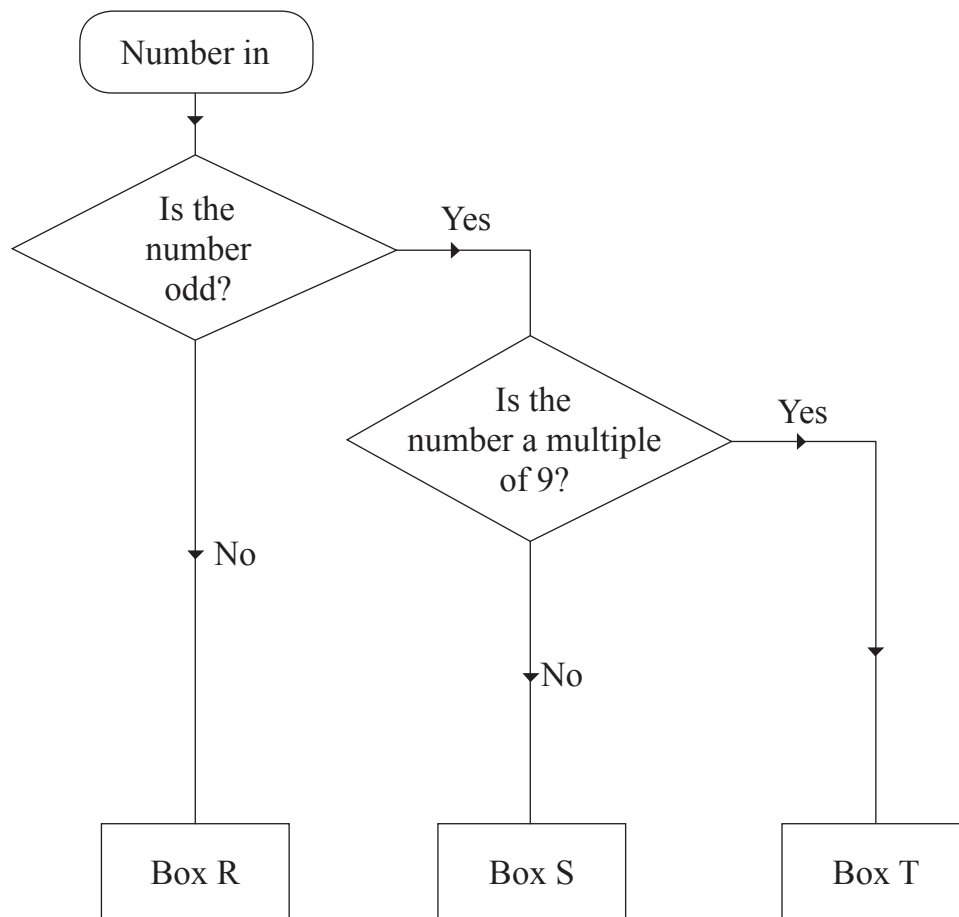
Using the decision tree diagram, name the box for

(a) 35

Answer Box _____

(b) 22

Answer Box _____

(c) 27

Answer Box _____ [2]

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10 Towns P and Q are shown on the map.

N

P •

• Q
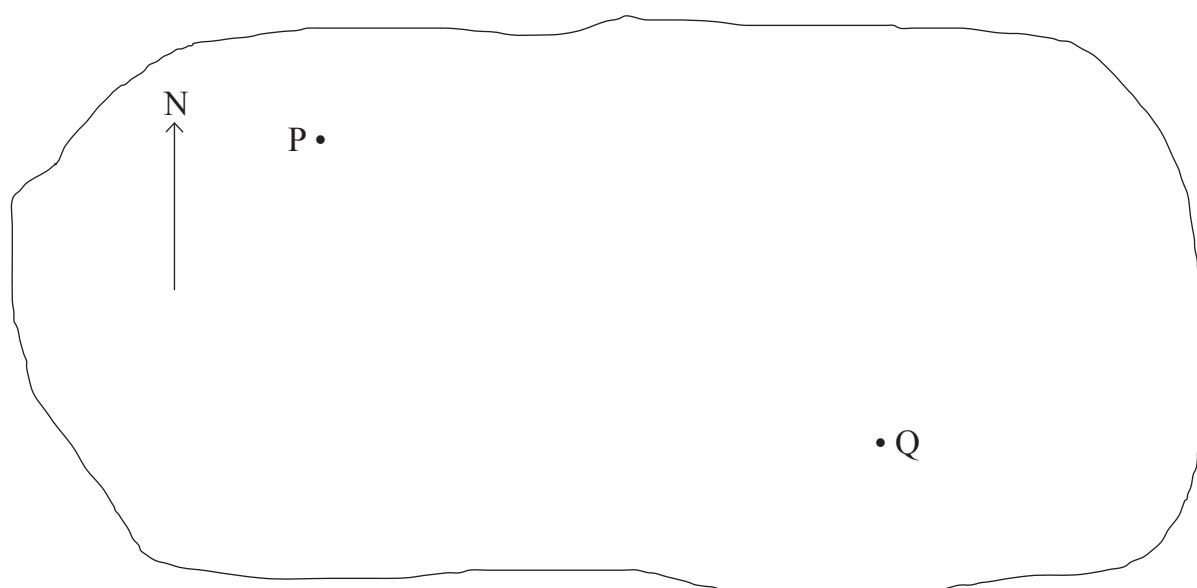
(a) Measure the bearing of Q from P.

Answer _____ ° [1]

(b) Measure the bearing of P from Q.

Answer _____ ° [1]

(c) The scale of the map is 1 cm to 5 km.

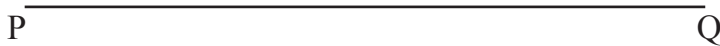Work out the actual distance between the two towns.

Answer _____ km [3]

[Turn over

32GMT2113

11 Draw accurately a triangle PQR with PQ = 9 cm, angle P = 70° and angle Q = 40°

Start with the line PQ below.

P ——————————————————————— Q

[2]

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12 Calculate the size of angle *x* in this quadrilateral.
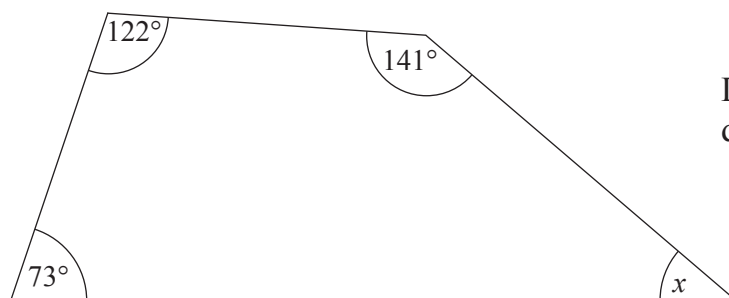
122°

141°

Diagram not
drawn accurately

73°

x

Answer *x* = _____ ° [2]

[Turn over

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32GMT2115

32GMT2115

Quality of written communication will be assessed in this question.

13 Julie needs to buy 20 oranges for school hockey matches.

A single orange costs 40 pence in each of two local stores.

Each store has a special offer on oranges.

Superfruit
20% off
when you buy
5 oranges
or more

Fruit Store
get 4 for
the price
of 3

Which is better value?

Show your working clearly.

Answer _____ [4]

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32GMT2116

14

Northern Gas

Standing charge is 9.71 pence per day

Gas costs 4.27 pence per unit

Colin's gas meter was read on 1st September. The reading was | 1 | 4 | 3 | 7 | 9 |

The meter was read again on 1st December. The reading was | 2 | 2 | 1 | 9 | 9 |

(a) Complete the box to show the number of units used.

| | | | | |

[1]

(b) Calculate the total gas bill that Colin will have to pay for the 91 days from
1st September, after VAT is charged at 5% on the total.

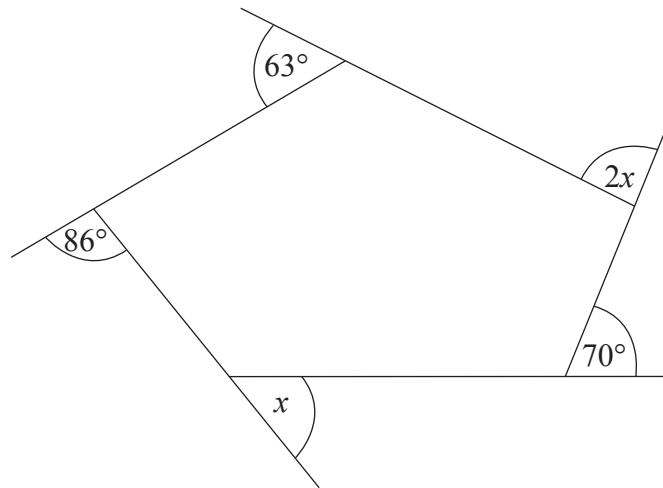Answer £ _____ [4]

[Turn over

10411

32GMT2117

15

63°

86°

2x

70°

x

Diagram not
drawn accurately

Work out the size of angle x in the diagram above.

Answer $x = $ _____ ° [4]

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32GMT2118

16 (a) Write an expression for the **total** cost in £ of x books at £3 each and y books at £7 each.

Answer £ _____ [2]

(b) Factorise

(i) $5t + 35$ Answer _____ [1]

(ii) $p^2 - 9p$ Answer _____ [1]

[Turn over

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32GMT2119

17 L is the point (−5, 6). N is the point (3, −2).

Write the co-ordinates of the midpoint of LN.

Answer (_____ , _____) [2]

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32GMT2120
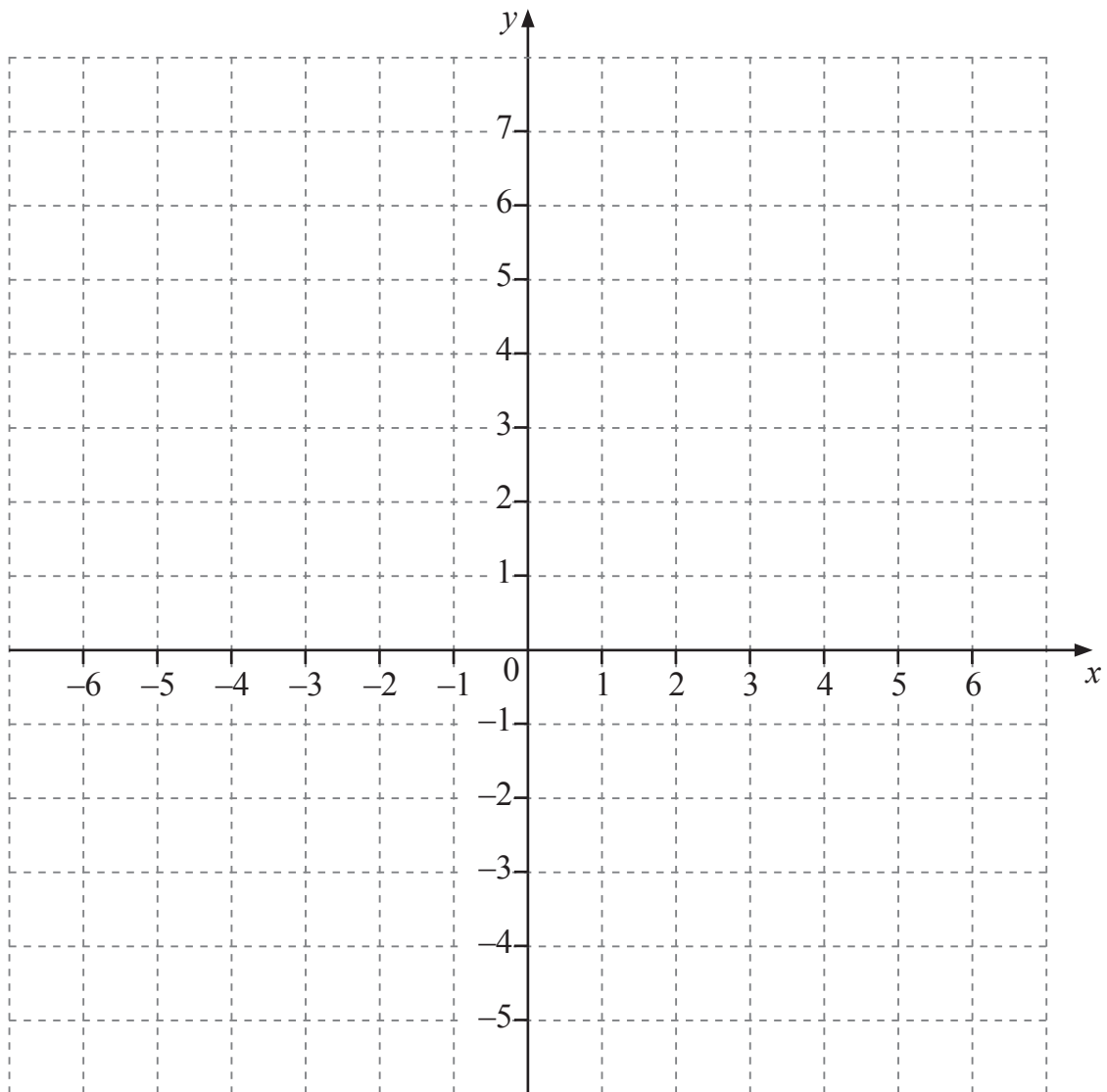
18 (a) A circular garden has a radius of 7 metres.

Calculate the area of the garden.

Answer _____ [3]

(b) The perimeter of a different garden is 64 metres, measured to the nearest metre.

Write down the greatest value and least value of the perimeter.

Answer greatest _____ m

least _____ m [2]

[Turn over

32GMT2121

19 Jack is a pupil at Northfield Boys School. He wants to know how many times a month the people in his town go to a football match. He asks 600 pupils in his school.

Give **two** reasons why Jack's sample may not be representative of the people in his town.

Reason 1 _____

_____ [1]

Reason 2 _____

_____ [1]

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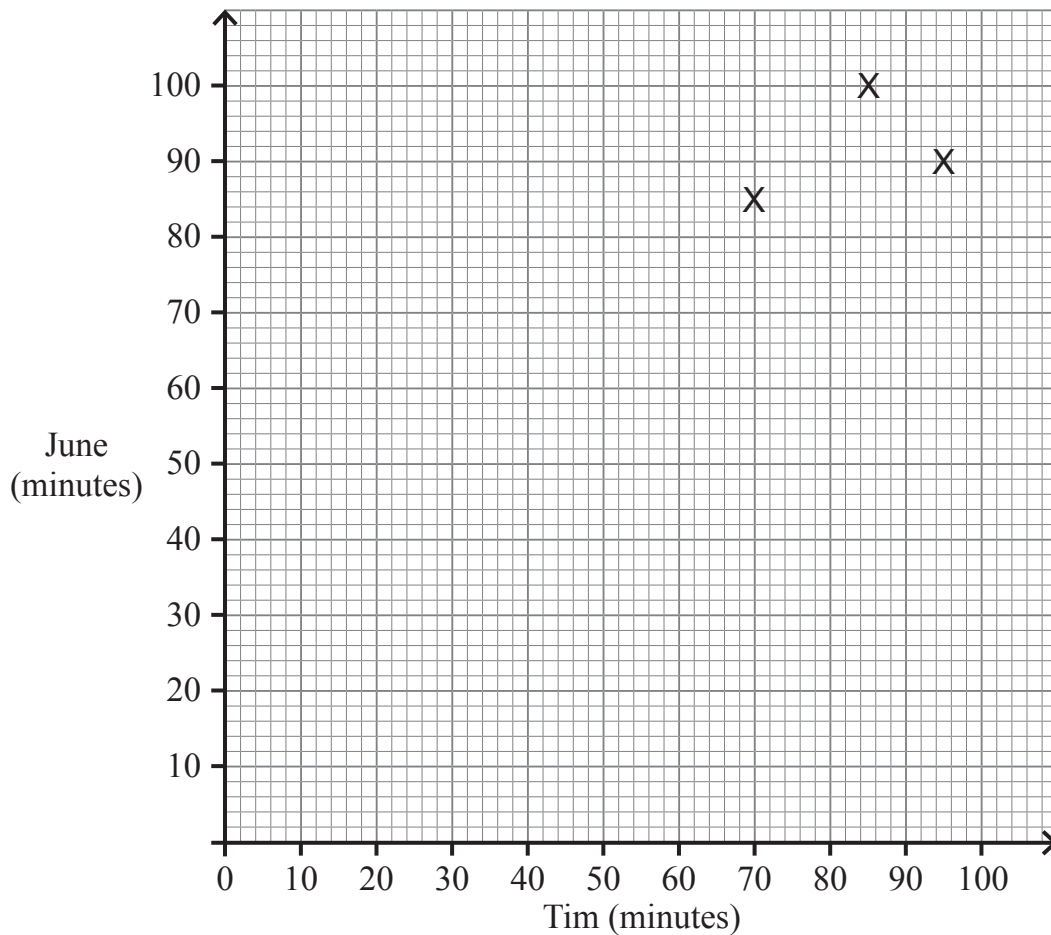
(Questions continue overleaf)

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32GMT2123

20 Tim and June recorded the amount of time in minutes they spent on different homeworks during one week. The results are shown below.

	Maths	English	Art	Geography	History	Science	Music	ICT
Tim	70	85	95	50	65	40	10	50
June	85	100	90	75	70	60	40	60

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(a) Use the data to complete the scatter graph. The first three results are already plotted. [2]

(b) Draw the line of best fit. [1]

(c) Tim spent 60 minutes on a Technology homework.

Use your line of best fit to estimate the time that June spent on the Technology homework.

Answer _____ minutes [1]

(d) What type of correlation does your graph show?

Answer _____ [1]

21 Solve $\qquad 4 + 3(2x - 5) = x + 9$

Answer $x =$ _____ [3]

[Turn over

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22 (a) Write 1620 as a product of its prime factors.

Answer _____ [2]

(b) Hence write down

(i) three square factors of 1620

Answer _____ [2]

(ii) one cube factor of 1620

Answer _____ [1]

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32GMT2126

23 A coat is priced £150

With 12% discount in a sale a profit of £7 is made.

What would the percentage profit be if the coat was sold at the full marked price?

Show all your working clearly.

Answer _____ % [5]

[Turn over

10411

32GMT2127

24 A solution to the equation $x^2 + 3x = 15$ lies between 2 and 3

Use trial and improvement to solve this equation.

Give your answer correct to 1 decimal place.

Show each stage of your working.

x	$x^2 + 3x$	

Answer $x =$ _____ [3]

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32GMT2128

Quality of written communication will be assessed in this question.

25 ABCD is a square.

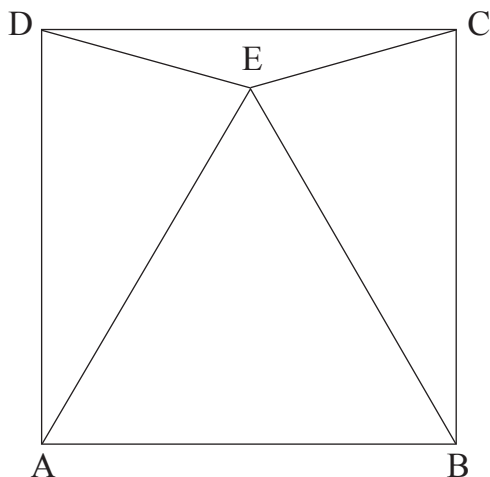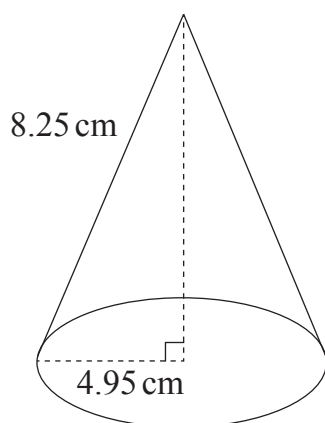ABE is an equilateral triangle.

Explain why angle DEC = 150°

D ┌─────────────────┐ C
              E

A └─────────────────┘ B

Diagram not
drawn accurately

[4]

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32GMT2129

26 A cone has a slant height of 8.25 cm and a radius of 4.95 cm.

8.25 cm

4.95 cm

Calculate the vertical height of the cone.

Answer _____ cm [3]

27 The weekly wages of eight office workers are listed below.

£202 £212 £221 £242 £250 £250 £260 £284

One person's wage of £110 was not on the list. If this wage is now included, write down whether each of the following will increase, decrease or stay the same.

(a) the mean wage will _____ [1]

(b) the modal wage will _____ [1]

(c) the median wage will _____ [1]

(d) the range of the wages will _____ [1]

32GMT2130

28 A girl runs 8 laps of a track in an average time of 48.2 seconds per lap.

After completing another 2 laps her overall average time is 49.4 seconds per lap.

Calculate her average time per lap for the last 2 laps.

Answer _____ seconds per lap [3]

THIS IS THE END OF THE QUESTION PAPER

32GMT2131

For Examiner's use only	
Question Number	**Marks**
1	
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Total Marks	

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Examiner Number [ ]

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32GMT2132