THIS IS A NEW SPECIFICATION

OCR
RECOGNISING ACHIEVEMENT

F

Thursday 26 January 2012 – Afternoon

GCSE METHODS IN MATHEMATICS

B392/01 Methods in Mathematics 2 (Foundation Tier)

B31695011 2

Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:
- Scientific or graphical calculator
- Geometrical instruments
- Tracing paper (optional)

Duration: 1 hour 30 minutes

B 3 9 2 0 1

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Your answers should be supported with appropriate working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- Your Quality of Written Communication is assessed in questions marked with an asterisk (*).
- The total number of marks for this paper is **90**.
- This document consists of **20** pages. Any blank pages are indicated.

You are permitted to use a calculator for this paper

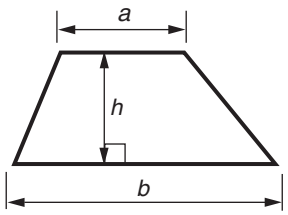
This paper has been pre modified for carrier language

OCR is an exempt Charity

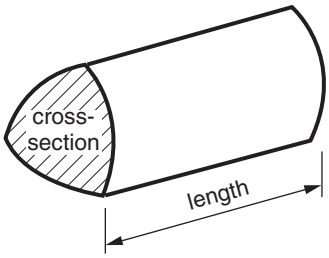
Turn over

Formulae Sheet: Foundation Tier

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



Volume of prism = (area of cross-section) × length



PLEASE DO NOT WRITE ON THIS PAGE

1 This table shows three sequences.

Sequence	Terms
P	50, 47, 44, 41, _____, _____
Q	3, 6, _____, _____, 48, 96
R	1, 4, 9, _____, _____, 36

(a) Fill in the two missing terms in each of these sequences. **[4]**

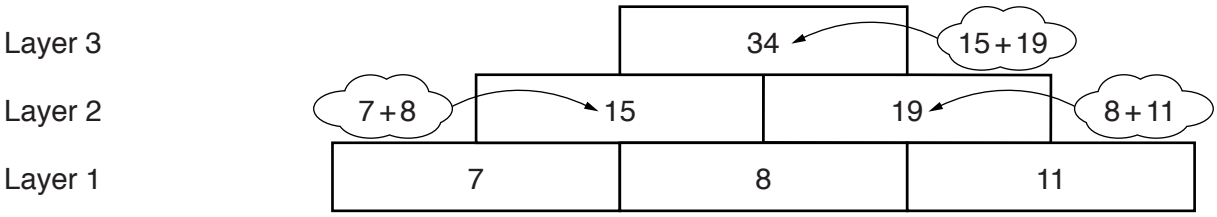
(b) Describe the term-to-term rule for sequence P.

(b) _____ **[1]**

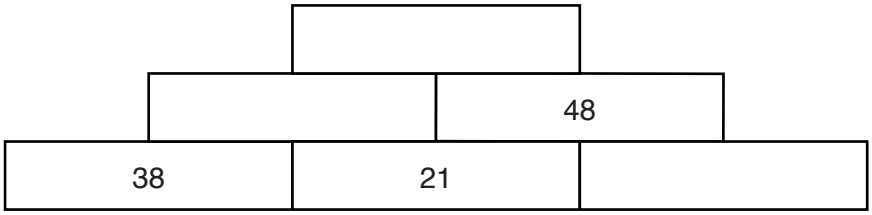
(c) What is the special name for the numbers in sequence R?

(c) _____ **[1]**

2 The numbers in layers 2 and 3 in this wall are made by adding together the two numbers next to each other in the layer below.



(a) Fill in the missing numbers in this wall.

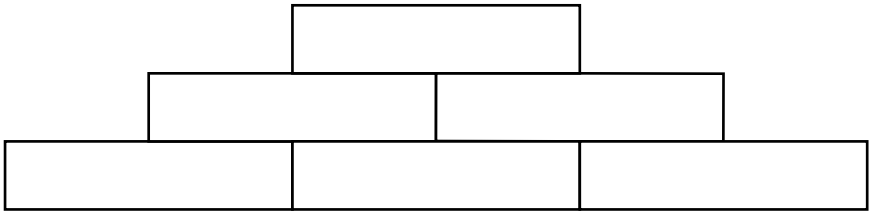


[2]

(b) **(i)** Fill in the missing numbers in this wall.

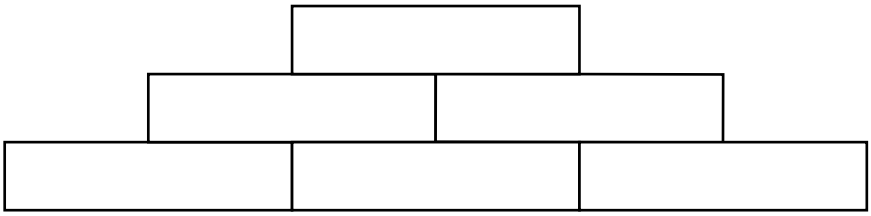
[1]

(ii) Rearrange the numbers 3, 5 and 9 in layer 1 to make the largest possible number in layer 3.



[1]

(iii) Choose a new set of three different numbers.
Arrange your chosen numbers in layer 1 to make the largest possible number in layer 3.

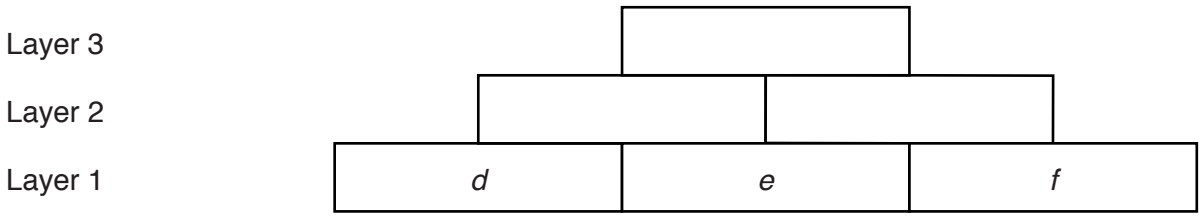


[1]

(iv) Describe what is special about the arrangement of numbers in layer 1 which makes the largest possible number in layer 3.

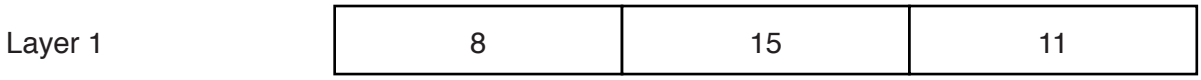
_____ **[1]**

(c) In this wall *d*, *e* and *f* represent three numbers in layer 1.



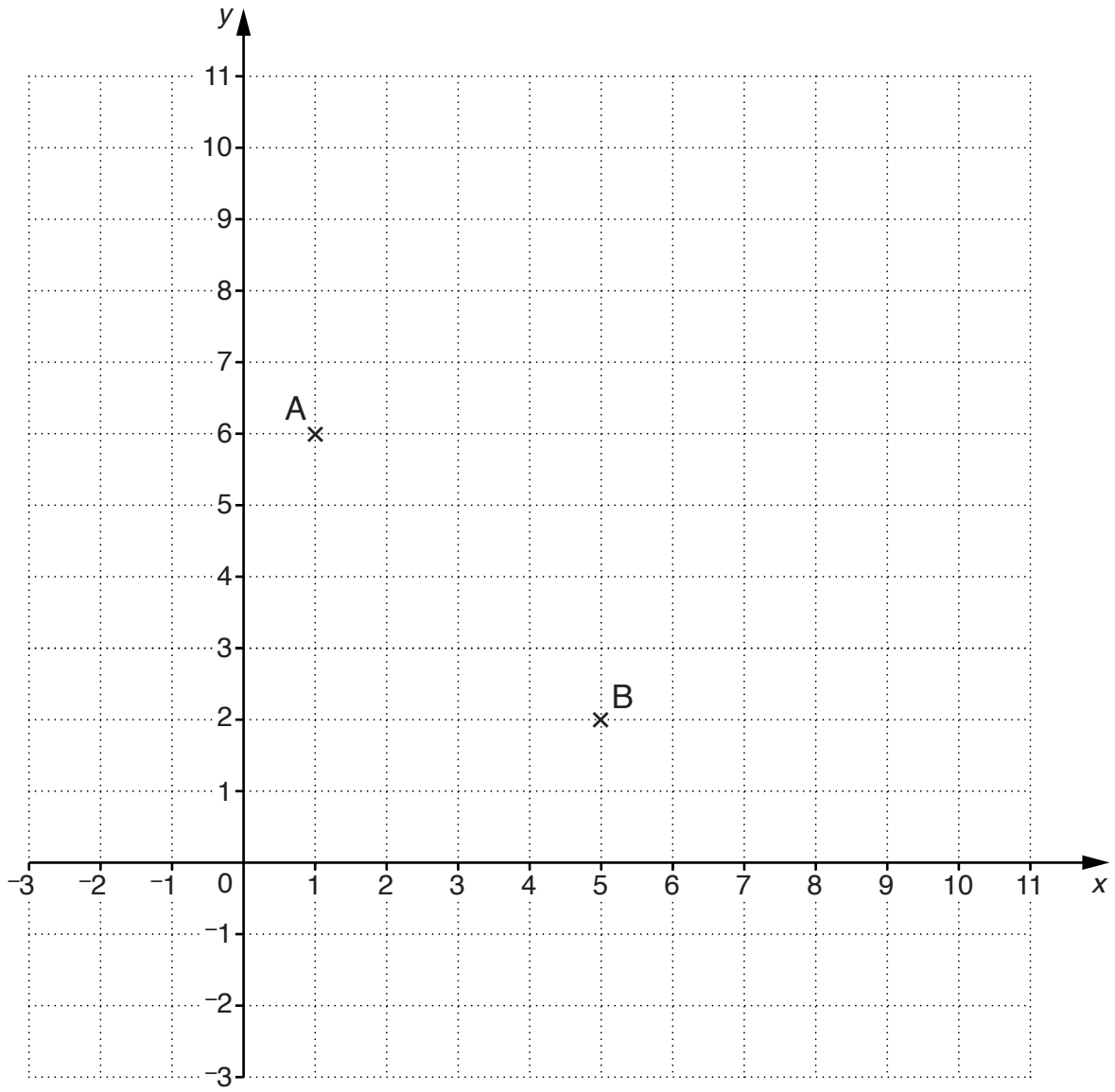
(i) In the wall write expressions in terms of *d*, *e* and *f* for the numbers in layers 2 and 3.
[2]

(ii) Use the expression in layer 3 of **(c)(i)** to explain why arranging the numbers 8, 11 and 15 like this will give the largest possible number in layer 3.



_____ **[1]**

3



(a) Write down the coordinates of **(i)** A,

(a)(i) (_____ , _____) **[1]**

(ii) B,

(ii) (_____ , _____) **[1]**

(iii) the midpoint of the line AB.

(iii) **(** _____ , _____ **)** **[1]**

(b) C is at (−2, 1) and D is at (10, 5).

Find the coordinates of the midpoint of the line CD.

(b) **(** _____ , _____ **)** **[2]**

(c) Work out, without plotting the points, the midpoint of the line EF where E is at (4, 20) and F is at (12, 50).

(c) **(** _____ , _____ **)** **[2]**

4* Brian wants to buy 36 Christmas cards.
The cards are sold in boxes.
This table shows information about the boxes of cards.

Box	Number of cards in a box	Price of box
A	8	£2.50
B	10	£2.99

He wants to buy special Christmas stamps to post the cards.
A booklet of stamps contains 12 stamps and costs £4.32.

Brian wants to buy exactly 36 cards and stamps.

Work out how much Brian will spend altogether.

£ _____ **[5]**

5 Calculate.

(a) $\dfrac{21.6 + 5.7}{2.9 - 1.4}$

(a) _____ **[2]**

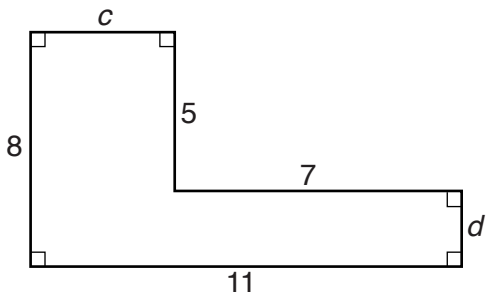
(b) 2.4^3

(b) _____ **[1]**

(c) $\frac{7}{8}$ of £400

(c) £ _____ **[2]**

6 All lengths in this shape are in centimetres.



Not to scale

(a) Work out the lengths c and d.

(a) $c =$ _____ cm

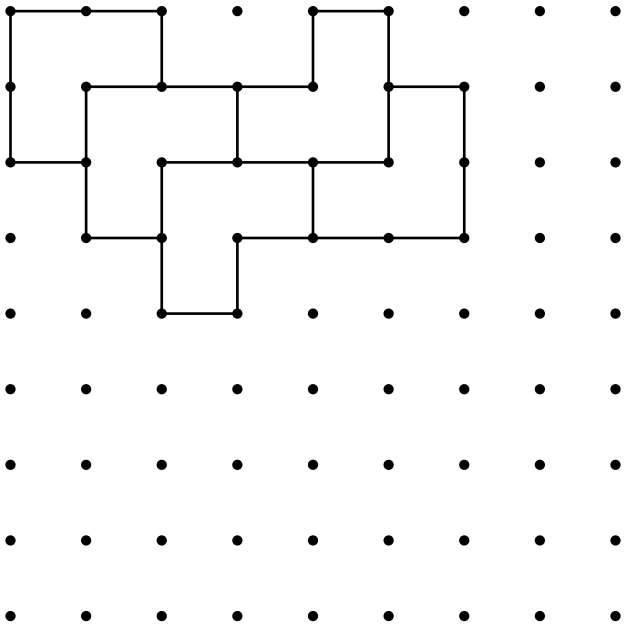
$d =$ _____ cm **[1]**

(b) Work out the area of the shape.

(b) _____ cm^2 **[3]**

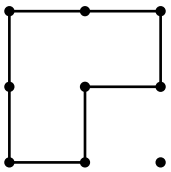
7 **(a)** This tessellation has been started on one centimetre dotty paper.

Continue the tessellation pattern. You should draw at least 6 more L shapes.



[2]

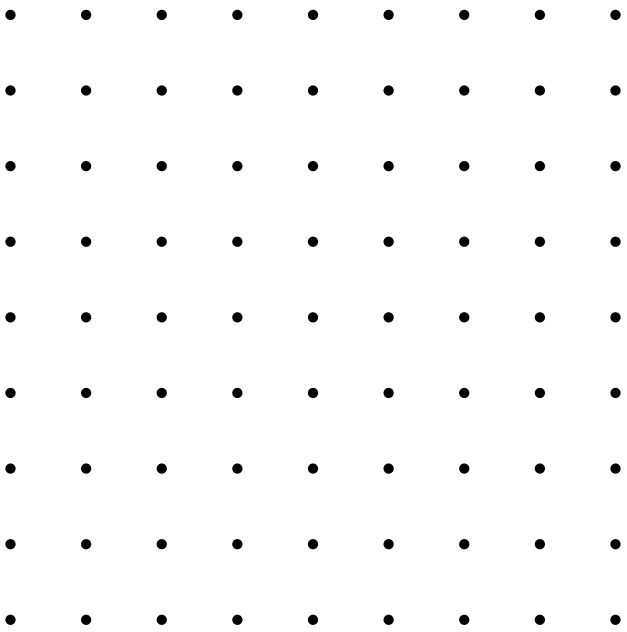
(b) **(i)** Find the perimeter of the L shape.



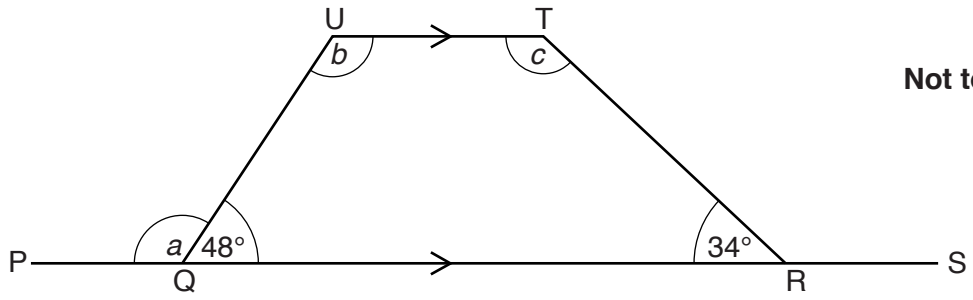
(b)(i) _____ cm **[1]**

(ii) A mathematically similar L shape has perimeter 24 cm.

Draw this similar L shape on the grid below. **[3]**



8 PS is parallel to UT.
Angle UQR = 48° and angle TRQ = 34°.



Not to scale

Work out the size of angles *a*, *b* and *c*.

a = _____ °

b = _____ °

c = _____ °

[4]

9 Kiran is making a mosaic pattern with coloured tiles.

Each tile is a square with sides of length 2 cm.

(a) How many tiles can she fit onto a rectangular board 30 cm by 20 cm?

(a) _____ **[3]**

(b) Kiran decides to use 4 yellow tiles for every 1 green tile.

How many tiles will she need of each colour?

(b) _____ yellow and _____ green **[2]**

10 **(a)** Work out 20% of £875.

(a) £ _____ **[2]**

(b) Aisha is doing a science experiment about plant growth.
A leaf is 25 mm long at the start of the experiment.
At the end of the experiment, the leaf is 29 mm long.

What is the percentage increase in the length of the leaf?

(b) _____ % **[3]**

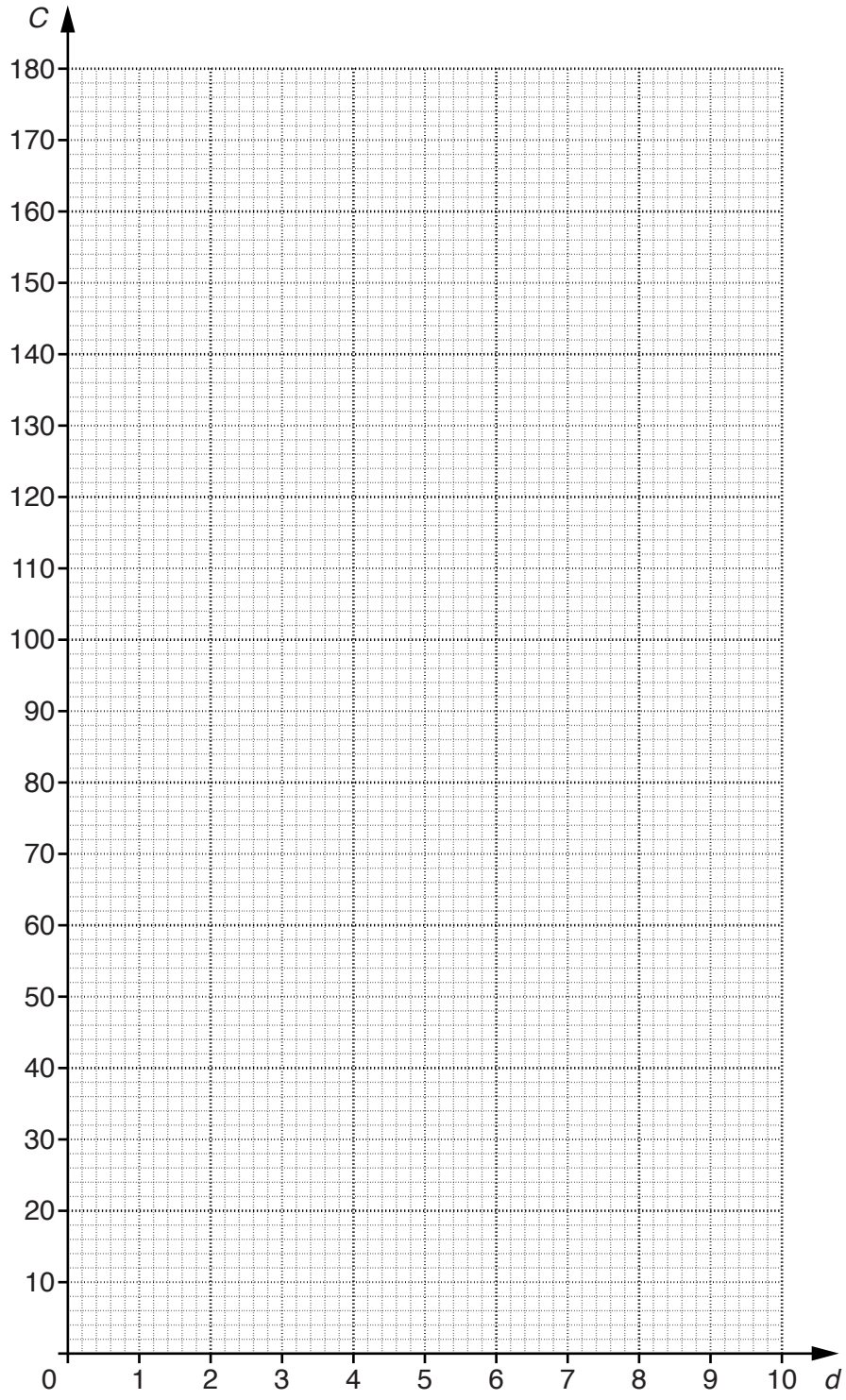
11 A car hire firm, *Reliable Motors*, uses a formula $C = 15d + 20$ to work out the hire charge, £C, for the number of hire days, d.

(a) Complete the table for $C = 15d + 20$.

d	1	2	3	10
C	35	50		

[2]

(b) Draw the graph of $C = 15d + 20$.



[2]

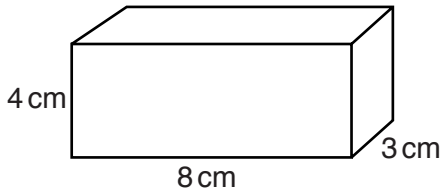
(c) At a different hire company, *Harry's Hires*, the charge for hiring a car is directly proportional to the number of days for which the car is hired.
The hire charge for 3 days at *Harry's Hires* is £66.

Kelly wants to hire a car for 8 days.

Which company, *Reliable Motors* or *Harry's Hires*, is cheaper and by how much?

(c) _____ is cheaper by £_____ **[4]**

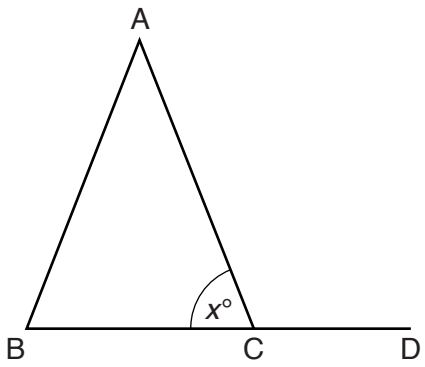
12



Calculate the volume of this cuboid.
Give the units of your answer.

_____ **[3]**

13 ABC is an isosceles triangle with AB = AC.
BCD is a straight line.
Angle ACB = $x°$.



Not to scale

(a) Write, in terms of x, expressions for

(i) angle ACD,

(a)(i) _____ ° **[1]**

(ii) angle BAC.

(ii) _____ ° **[2]**

(b) Using your expressions from part **(a)**, show that the exterior angle of this isosceles triangle is equal to the sum of the interior angles at the other two vertices.

_____

_____

_____

_____ **[2]**

14 The nth term of a sequence is $6n - 1$.

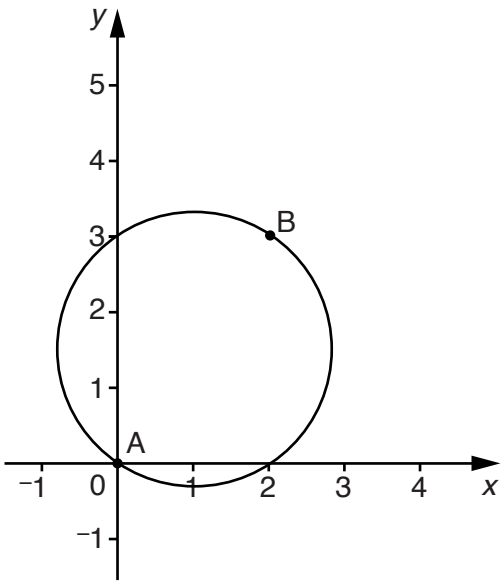
(a) Write down the first two terms of the sequence.

(a) _____ , _____ **[2]**

(b) How many terms in the sequence are smaller than 100?

(b) _____ **[3]**

15 A is the point (0, 0). B is the point (2, 3).
AB is the diameter of a circle.



(a) Show that the length of AB is 3.6 units, correct to 1 decimal place.

_____

_____

_____

_____

_____

_____ **[3]**

(b) Work out the circumference of the circle.

(b) _____ units **[2]**

16 A pile of 6 identical textbooks is 15.9 cm high.

(a) How high will a pile of 10 of these textbooks be?

(a) _____ cm **[2]**

(b) A shelf space is 23 cm high.

How many of the textbooks could be put in a single pile in this space?

(b) _____ **[2]**

17* Janice is using these numbers to make a new number.

10	1	4	5

She can only use +, −, ×, ÷ and brackets to combine the numbers.

- She cannot use any number more than once.
- She cannot use powers.
- She cannot put digits together, eg she can't use 145.

What is the biggest number Janice can make?
Show how she can make this number.

_____

_____

_____

_____

_____

_____

_____ **[4]**

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

PLEASE DO NOT WRITE ON THIS PAGE