Cambridge Assessment International Education

Cambridge Lower Secondary Checkpoint

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

0735182016

MATHEMATICS **0862/02**

Paper 2 **April 2023**

1 hour

You must answer on the question paper.

You will need: Geometrical instruments
Tracing paper (optional)

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should show all your working in the booklet.
- You may use a calculator.

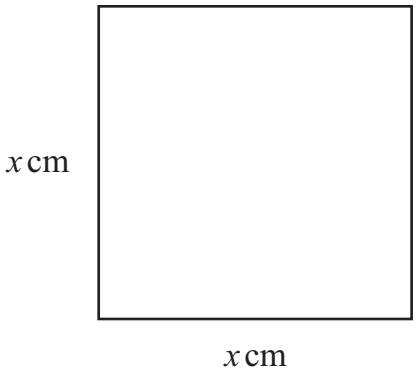
INFORMATION

- The total mark for this paper is 50.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Any blank pages are indicated.

IB23 04_0862_02/6RP

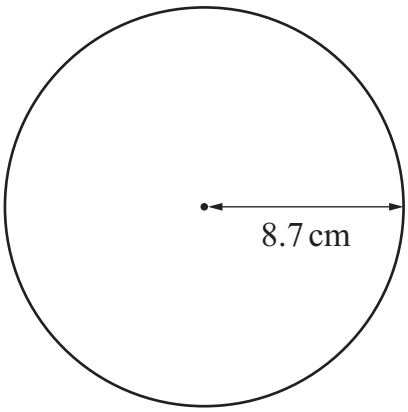
1 A square has a side length of x cm.



Find an expression for the area of the square.
Give your answer in its simplest form.

..... x^2 ..... cm^2 [1]

2 A circle has a radius of 8.7 cm.



NOT TO SCALE

Find the area of the circle.

$\pi r^2 = \pi (8.7)^2$

..... 238 ..... cm^2 [2]

3 Naomi and Samira share some apples.
Naomi receives less than half of the apples. Naomi < Samira

Draw a ring around the possible value of the ratio of Naomi's share to Samira's share.

1 : 5 3 : 2 1 : 1 7 : 5

Naomi : Samira < 1 : 2

[1]

4 Use the numbers in the box to complete the sentences.

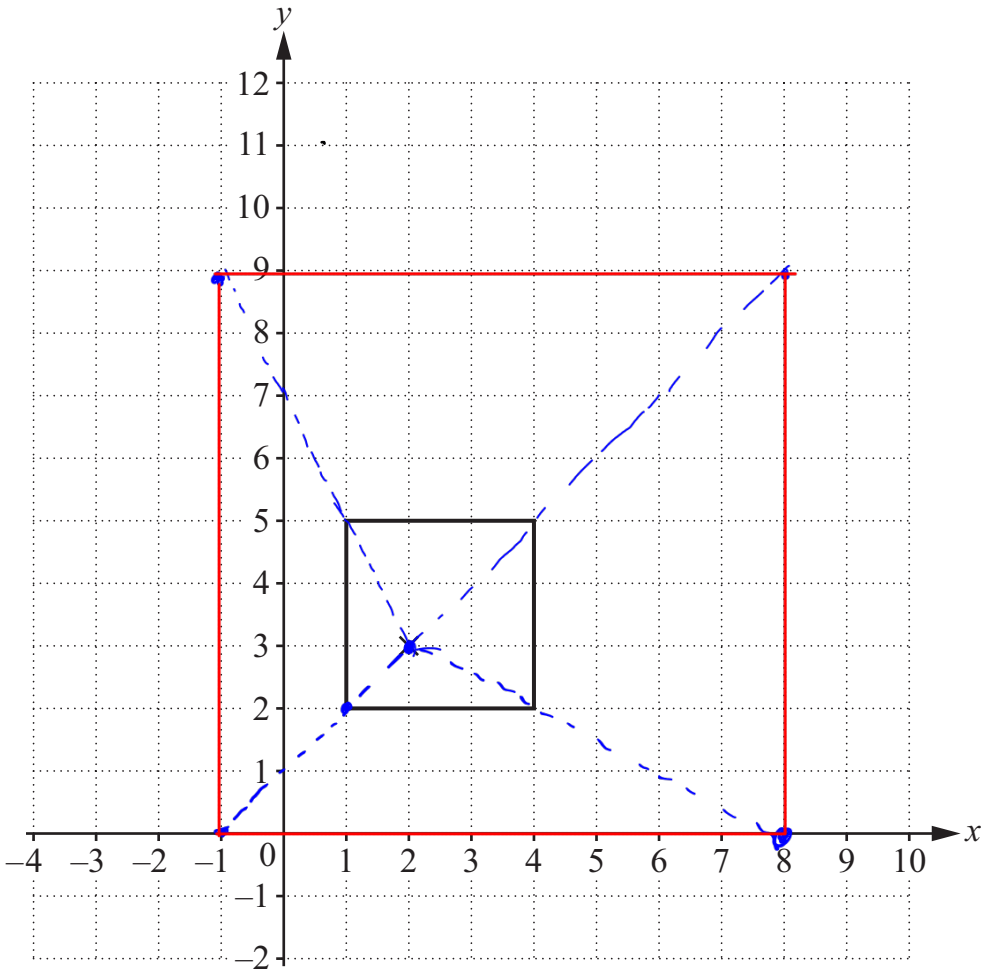
$\sqrt{19}$	$\frac{19}{6}$	8^2
π		

$\frac{19}{6}$ and 8^2 are rational numbers.

$\sqrt{19}$ and π are irrational numbers.

[1]

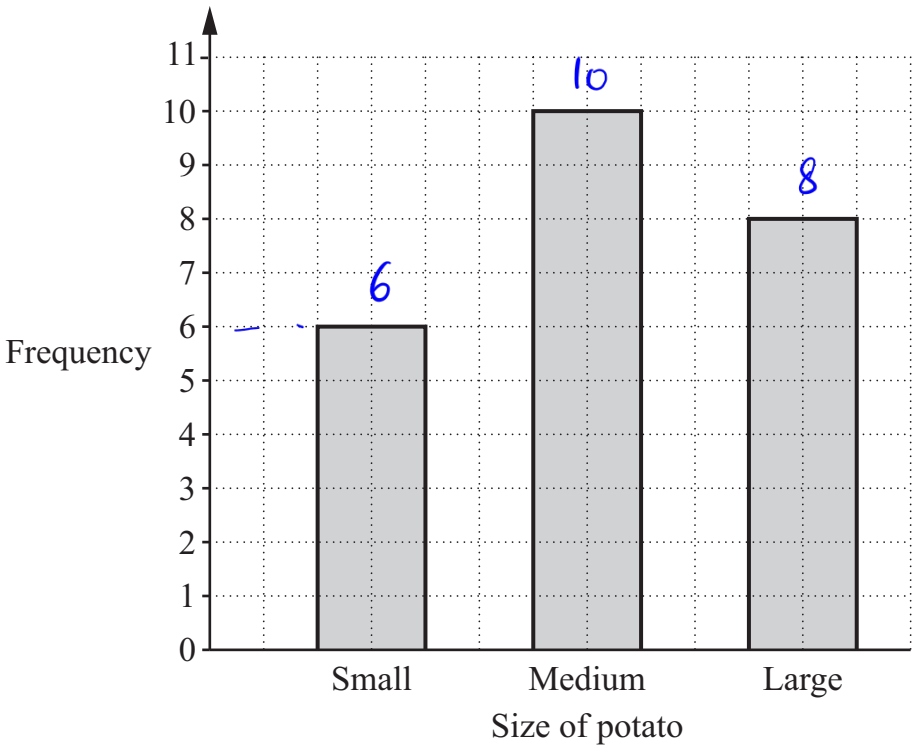
5 The diagram shows a square drawn on a coordinate grid.



Draw the image of the square after an enlargement, scale factor 3, centre (2, 3).

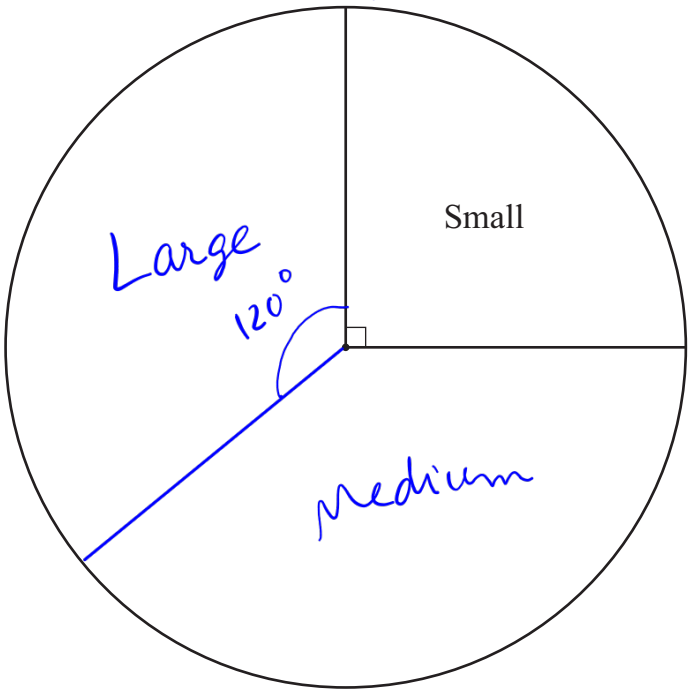
[2]

6 The bar chart shows the number of small, medium and large potatoes in a sack.



Complete the pie chart to show this information.

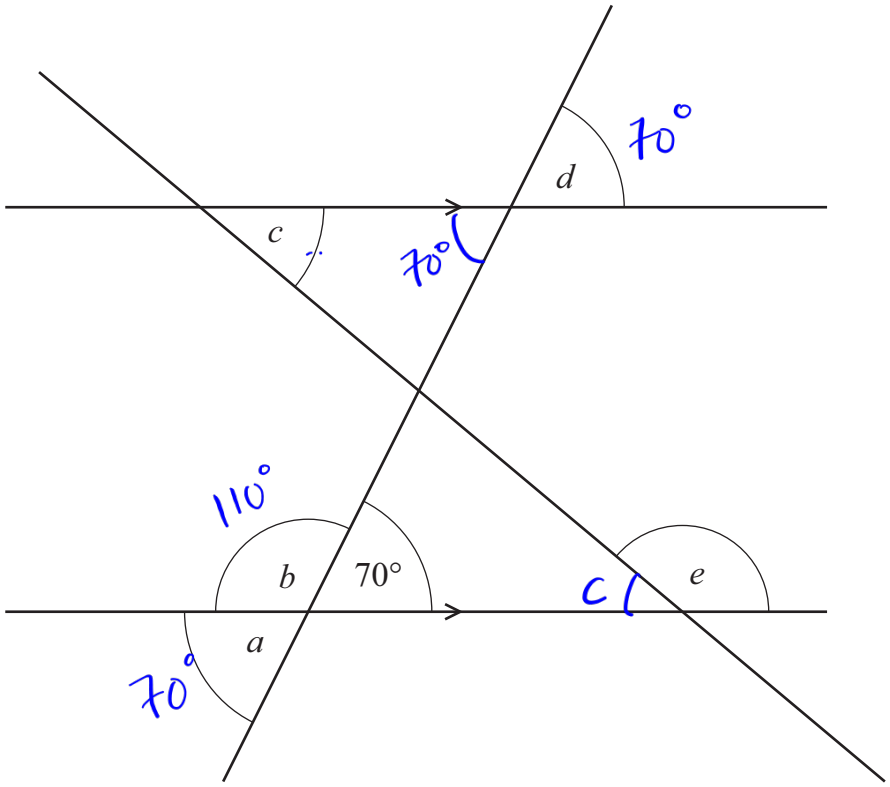
$$\frac{\text{Large}}{\text{Total}} = \frac{8}{6+10+8} = \frac{8}{24} = \frac{1}{3}$$



[3]

7 The diagram shows two parallel lines and two transversals.

NOT TO SCALE



Draw a ring around all the angles that **must** be equal to 70°.

a *b* *c* *d* *e*

[1]

8 Here are three scatter diagrams.

Diagram A

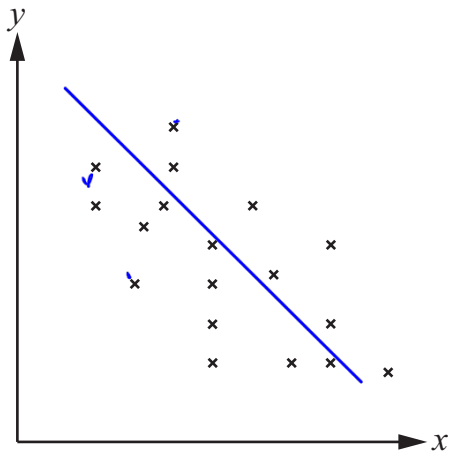


Diagram B

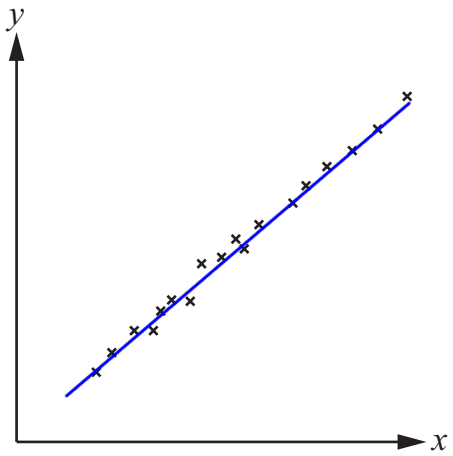
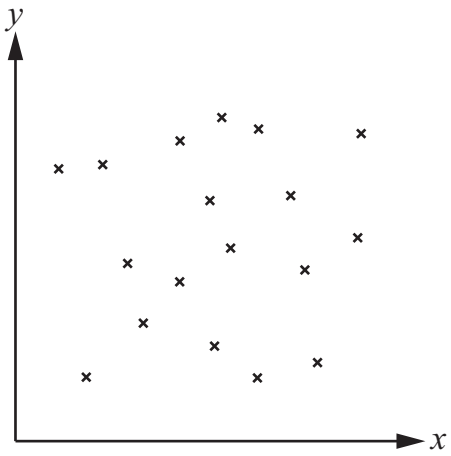
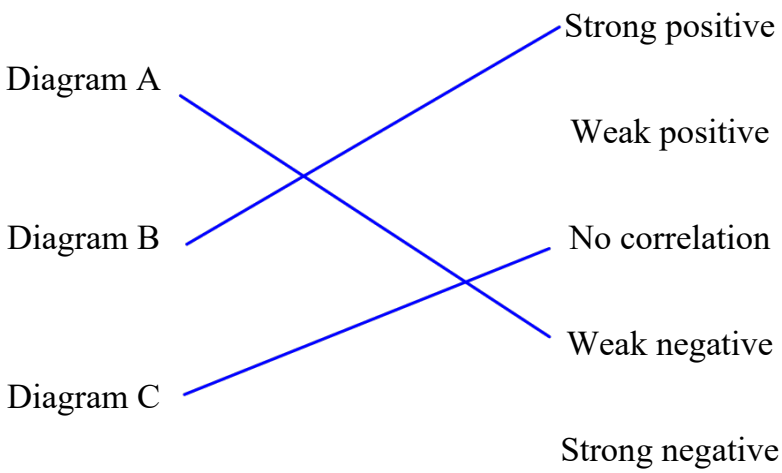


Diagram C



Draw a line to match each scatter diagram to the best description of its correlation.



[1]

9 Ahmed has two bags each containing four balls.
The balls in bag A are numbered 1, 3, 5 and 6
The balls in bag B are numbered 2, 3, 4 and 6

Ahmed picks a ball at random from each bag.
He adds together the numbers on the two balls to get a total score.

Show that P(total score is even) = P(total score is more than 8).
You may use the table to help you.

Bag A

Bag B	+	**1**	**3**	**5**	**6**
	2	3	5	7	8
	3	4	6	8	9
	4	5	7	9	10
	6	7	9	11	12

P(total score is even) = $\frac{6}{16}$

P (total score is > 8) = $\frac{6}{16}$

.....

.....

..... [3]

10 **(a)** Here are the definitions of some angles.

A = interior angle of an equilateral triangle	B = interior angle of a regular pentagon
C = exterior angle of a regular pentagon	D = exterior angle of a regular hexagon

Draw a ring around the **two** angles that add up to 180°.

A B C D

[1]

(b) Find the sum of the interior angles of a 7-sided polygon.

$(n-2) \times 180°$

$(7-2) \times 180°$

$= 900°$

900 ° [1]

11 **(a)** A number, x, rounded to the nearest 100 is 1500

Complete the inequality to show the possible values of x.

round up

round down

1450 $\leq x <$ 1550

[1]

(b) The time taken to run a race is 9.87 seconds correct to 3 significant figures.

Write down the upper limit for the time.

round down

9.874̇9 s [1]

12 **(a)** Yuri wants to investigate how exercise changes his heart rate.
He considers two methods for measuring his heart rate.

Method A	Method B
	
Find his heart rate by placing two fingers on his wrist and counting the beats.	Find his heart rate using a digital heart rate monitor.

Yuri decides to use method A.

Give one reason why this may **not** be the better method.

Humans can not be accurate as machines [1]

(b) Yuri also wants to compare his results with those for other people his age.
He decides to repeat his experiment on 40 members of a gym.

Explain why his sampling method may **not** give him reliable data about the heart rates of other people his age.

The data he collects may be biased due to the focusing on members in a gym [1]

13 Hassan thinks of a number, n.
He multiplies it by 4
His answer is greater than –8 and less than or equal to 20

(a) Write the correct inequality signs to complete the inequality.

-8 ..... $4n$ 20

[1]

(b) Solve the inequality to find the possible values of n.
Give your answer as an inequality in terms of n.

$\frac{-8}{4} < \frac{4n}{4} \leq \frac{20}{4}$

$-2 < n \leq 5$ ..... $-2 < n \leq 5$ [2]

14 In September a coat costs \$62.50
In October the cost of the coat increases by 4% of the cost in September.
In November the cost of the coat increases by a further 14.6% of the cost in October.

Find the cost of the coat after both increases.

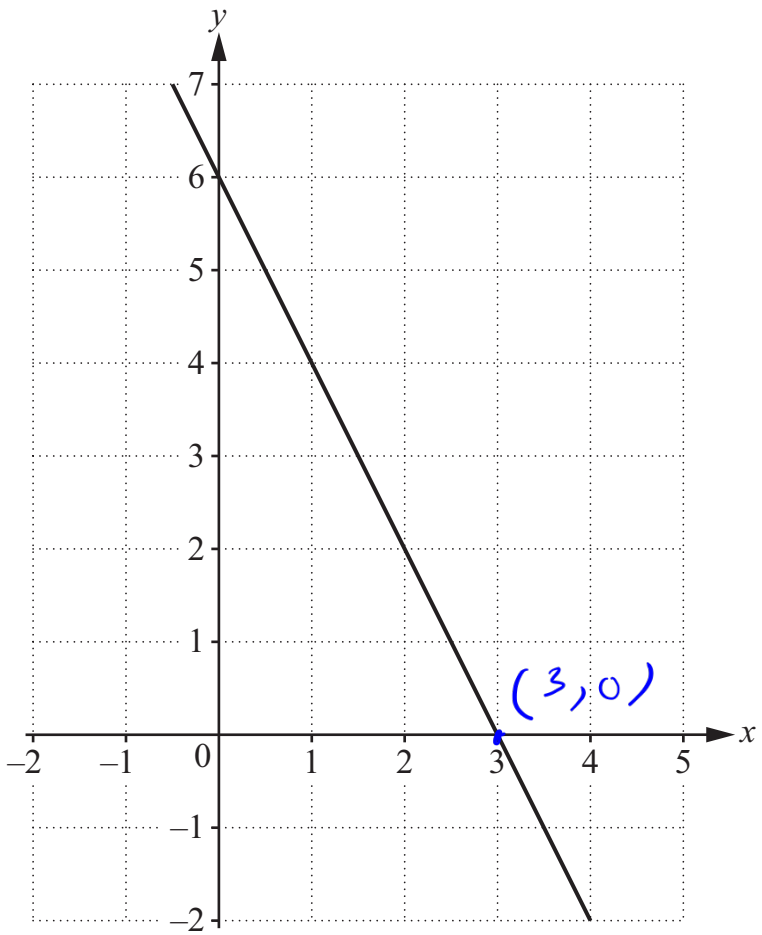
Cost of coat in Oct: $62.50 + 62.50 \times 4\% = 65$

Cost of coat in Nov: $65 + 65 \times 14.6\% = 74.49$

\$ ..... 74.49 ..... [2]

15 Find the equation of the graph.

Give your answer in the form $y = mx + c$.



$m = \frac{-6}{3} = -2$

$y = -2x + c$

$0 = -2 \times 3 + c$

$c = 6$

$y =$ $-2x + 6$ [2]

16 The first term of a sequence is –0.7

The term-to-term rule of the sequence is 'multiply by –1 and then add 0.5'

(a) Show that the sum of the first four terms of the sequence is 1

1st	2nd	3rd	4th
−0.7	1.2	−0.7	1.2

The sum of the first 4 terms: $(-0.7 + 1.2) \times 2 = 1$

[2]

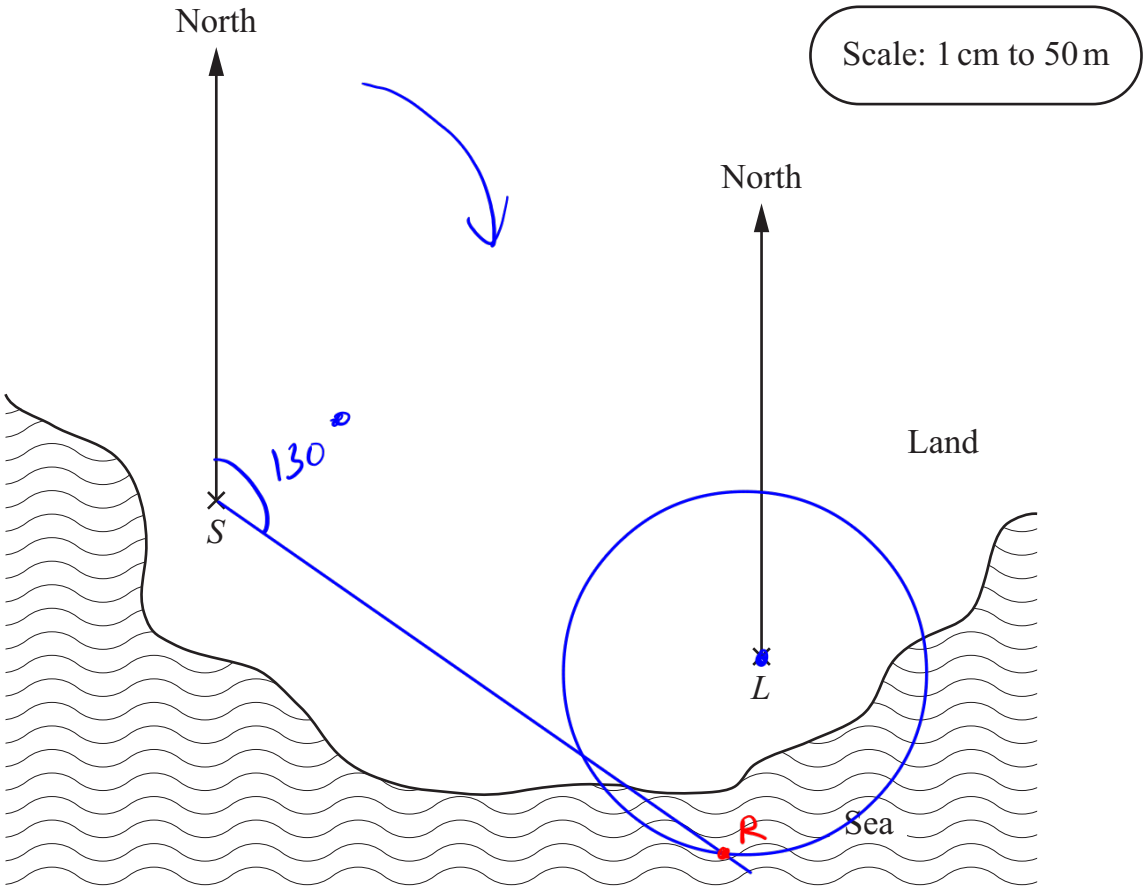
(b) Complete the following statements.

The sum of the first 12 terms of this sequence is $6 \times 0.5 = 3$

The sum of the first 400 terms of this sequence is $200 \times 0.5 = 100$

[1]

17 The map shows the position of a shop, S, and a library, L, on an island.
The scale of the map is 1 cm to 50 m.

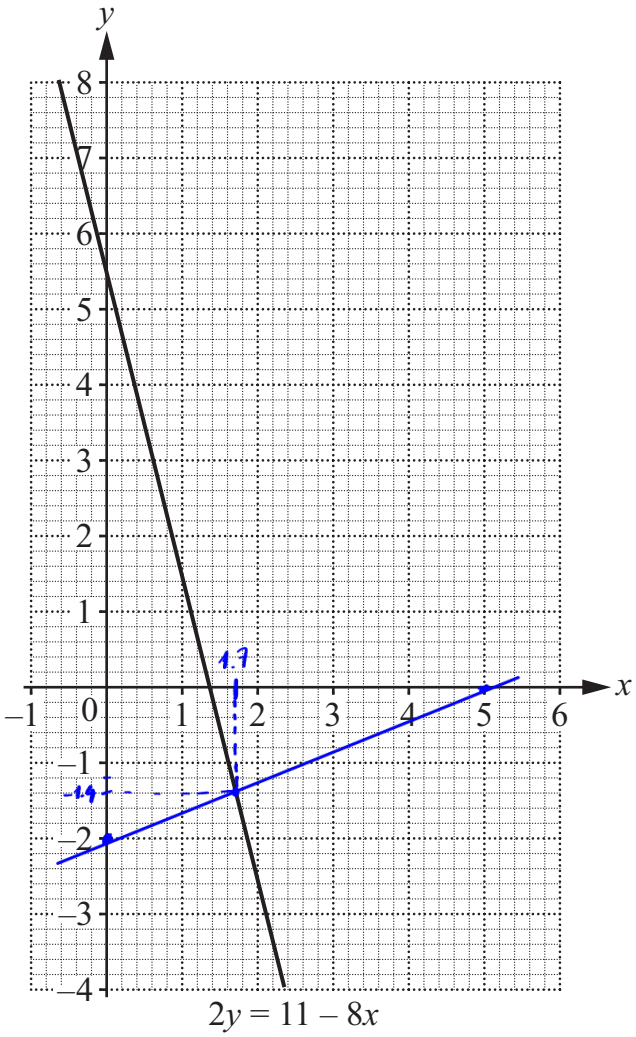


A restaurant, R, is built on the island

on a bearing of 130° from the shop
and
220 metres from the library. = 4.4 cm on the map.

Mark the position of the restaurant on the map. [2]

18 The graph of $2y = 11 - 8x$ is shown on the grid.



(a) Draw the graph of $2x - 5y = 10$ on the grid.
Use the table of values to help you.

x	0	5
y	−2	0

[2]

(b) **Use your graph** to solve the simultaneous equations.

$2y = 11 - 8x$
$2x - 5y = 10$

$x =$ 1.7

$y =$ −1.4

[2]

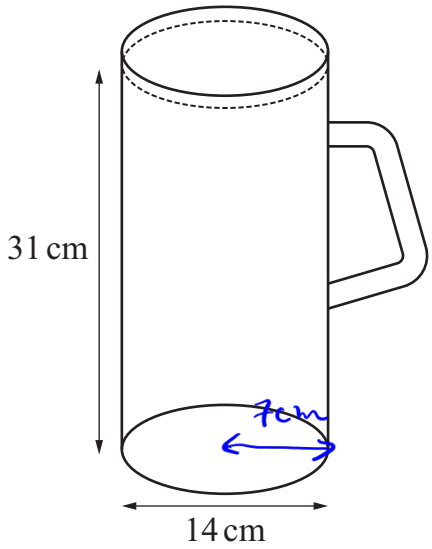
19 The cross-section of a prism is a regular polygon.
The prism has exactly 6 planes of symmetry.

Draw a ring around the shape of the cross-section.

square pentagon hexagon octagon

[1]

20 A jug is a cylinder with a diameter of 14 cm.
The height of the water in the jug is 31 cm.



NOT TO SCALE

The capacity of a glass is 315 cm^3.

Find how many of these glasses can be completely filled using the water in the jug.

$V_{\text{water in the jug}} = 31 \times \pi r^2$

$= 31 \times \pi \times 7^2$

$= 4772 \text{ cm}^3$

$4772 : 315 = 15.1$

15 [3]

21 Here are some of the inputs and outputs of a function.

input		output
x	→	$5x^2$
a	→	180

a is an integer.

Find the **two** possible values of the output when the input is $a + 1$

$5a^2 = 180$

$a^2 = 36$

$a = 6$ or $a = -6$

input

7

-5

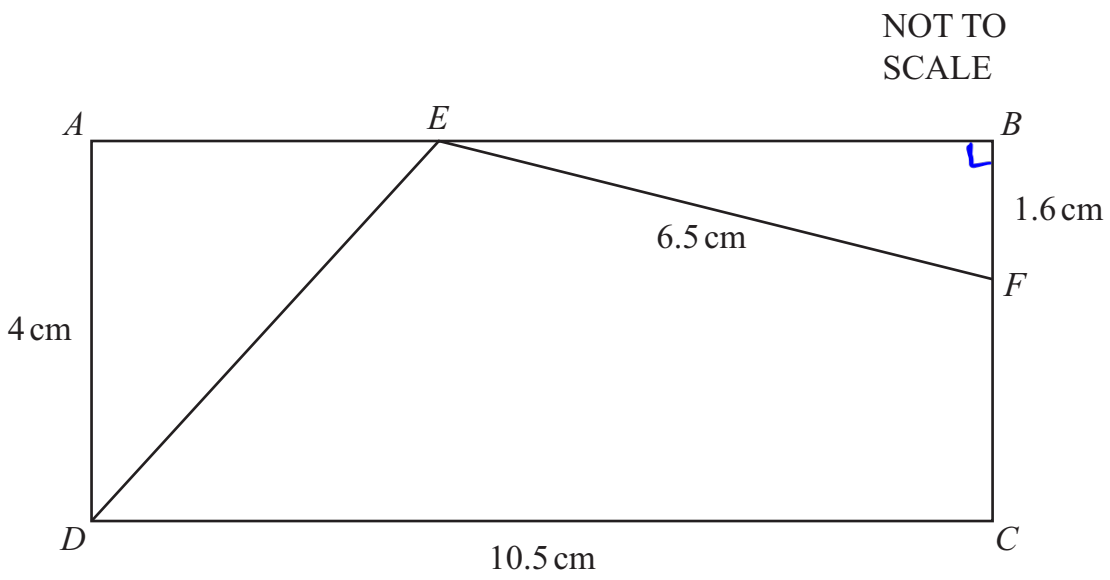
output

$5 \times 7^2 = 245$

$5(-5)^2 = 125$

245 and 125 [3]

22 *ABCD* is a rectangle measuring 4 cm by 10.5 cm.



$EF = 6.5$ cm
$BF = 1.6$ cm

Calculate DE.

$EB = \sqrt{6.5^2 - 1.6^2} = 6.3$

$AE = AB - EB = 10.5 - 6.3 = 4.2$

$DE = \sqrt{4.2^2 + 4^2} = 5.8$

5.8 cm [4]

23 a and b are positive integers.

$\frac{a}{b} = 0.37$ correct to 2 significant figures.

b is a cube number less than 200

Find a possible pair of values for a and b.

b : 1 8 27 64 125

a 2.96 9.99

2 3 9 10

$a =$ 10

$b =$ 27

[2]