Cambridge Assessment International Education

Cambridge Lower Secondary Sample Test

For use with curriculum published in September 2020

Mathematics Paper 1

Stage 9

1 hour

Name .....

Additional materials: Geometrical instruments
Tracing paper (optional)

INSTRUCTIONS

- Answer **all** questions.
- Write your answer to each question in the space provided.
- You should show all your working on the question paper.
- You are **not** allowed to 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 [ ].

1 Write one of the signs

$<$ $>$ $=$

to complete each statement.

0.3×10^2 9

20×10^{-1} 2

[1]

2 Here are some ratios.

A	B	C	D
9 mm : 1.5 cm	60 cm : 1 m	800 g : 1.2 kg	150 m : 0.25 km

Write each ratio in the correct position in the table.
One has been done for you.

Ratios equivalent to 2 : 3	**Ratios equivalent to 3 : 5**
	A

[1]

3 **(a)** Simplify.

$$\frac{5mn}{2n}$$

..... [1]

(b) Simplify.

$$\frac{4n+12}{6}$$

..... [1]

(c) Expand and simplify.

$$(x + 2)(x - 2)$$

..... [1]

4 Solve.

$$4x - 1 < 2x + 19$$

..... [2]

5 Work out.

(a) $(8 \times 0.75)^2 \times 0.5$

..... [1]

(b) $\frac{2}{5} \times 127 - \frac{2}{5} \times 7$

..... [2]

6 A has coordinates (6, –2).
B has coordinates (18, 8).

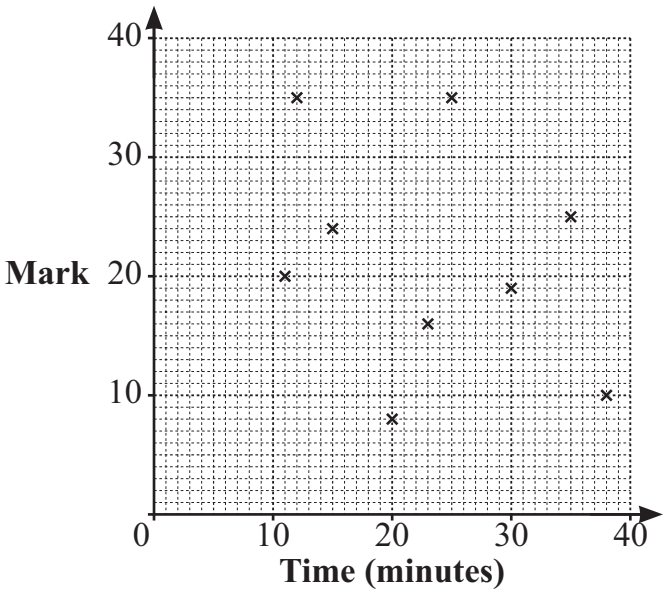
Pierre says that the midpoint of AB has coordinates (12, 5).

Show that Pierre is wrong.
Show your working.

[1]

7 Some boys take a mathematics test.

The scatter graph shows the time taken by each boy to complete the test and the mark they each got.



(a) Draw a ring around the type of correlation shown on the scatter graph.

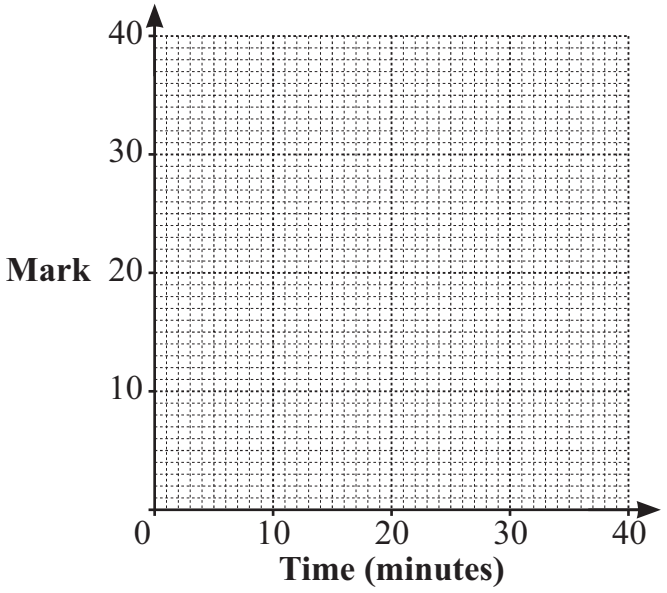
strong negative weak negative no correlation

weak positive strong positive

[1]

(b) **Seven** girls take the same mathematics test.
The scatter graph for the girls shows strong positive correlation.

Complete the scatter graph to show a possible set of results for the girls.



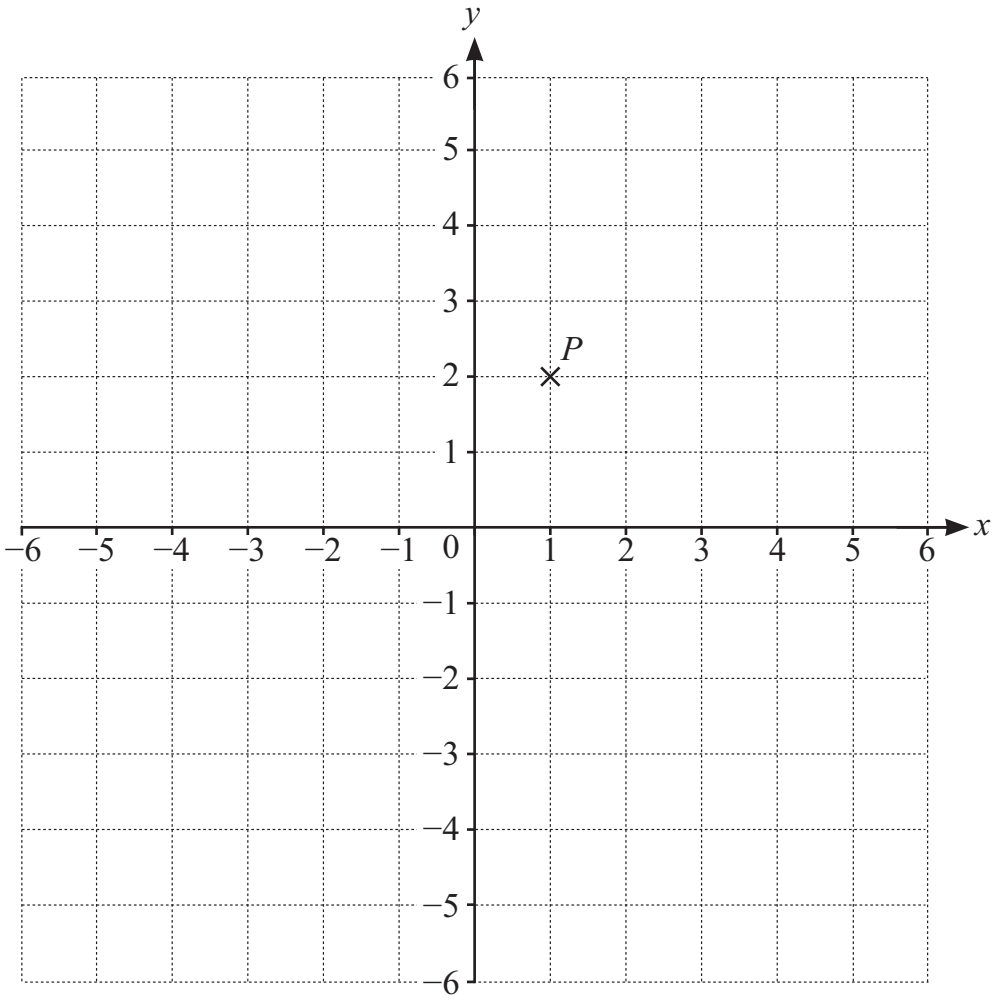
[1]

8 Look at the numbers in the box.

π	$\frac{2}{5}$	1.289
$\sqrt[3]{8}$	$\sqrt{8}$	$1.\dot{5}$

Draw a ring around **all** the irrational numbers. [1]

9 The point P has coordinates (1, 2).



The point P is translated by the vector $\begin{pmatrix} -5 \\ 1 \end{pmatrix}$ to give the point Q.

The **point Q** is then reflected in the line $y = -1$ to give the point R.

Find the coordinates of the point R.

(..... , ...) [2]

10 Here are the nth term rules of three sequences.

Sequence A	$7n$
Sequence B	$5n - 1$
Sequence C	$20 - 3n$

Match each of these numbers to the sequence it is a term in.

24	Sequence A
11	Sequence B
35	Sequence C

[1]

11 ◆ is an integer greater than 1
▲ is a decimal smaller than 1

◆ ÷ ▲ = 60

Write down possible values for ◆ and ▲

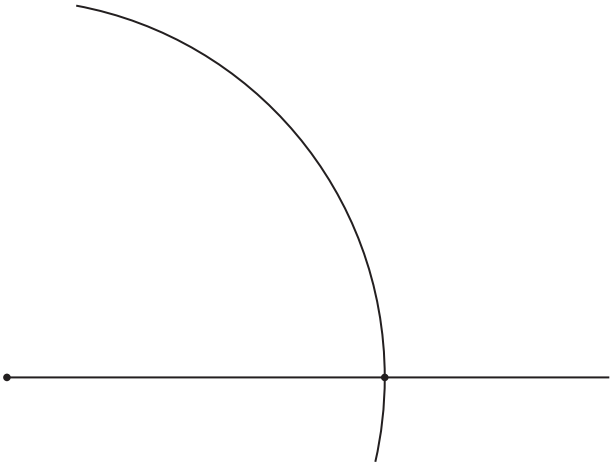
◆ = ...

▲ = ...

[1]

12 In this question use a ruler and compasses only.
Show your construction lines.

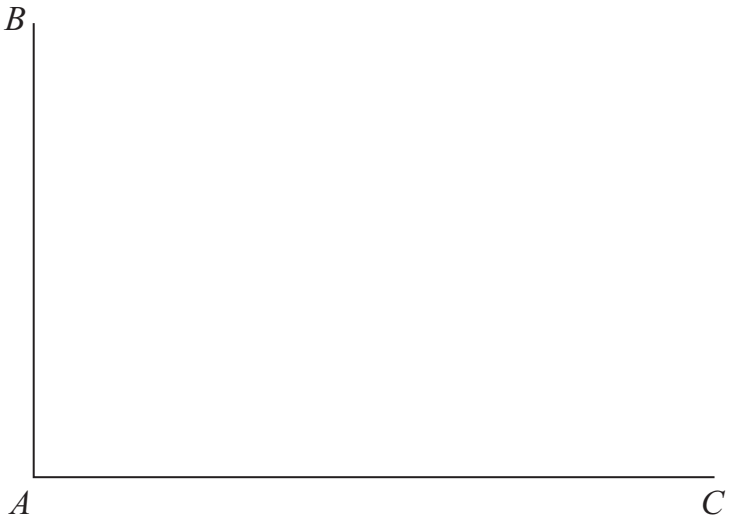
(a) Complete this construction of an angle of 60°.



[1]

(b) In the diagram angle $BAC = 90°$.

Use the diagram to construct an angle of 45°.



[2]

13 Look at this sequence of calculations.

$1 \times 5 - 2 \times 3 = -1$
$2 \times 6 - 3 \times 4 = 0$
$3 \times 7 - 4 \times 5 = 1$
$4 \times 8 - 5 \times 6 = 2$

(a) Write down the next calculation in this sequence.

..... × ..... – ..... × ..... = ...

[1]

(b) Use the sequence to work out.

$37 \times 41 - 38 \times 39$

..... [1]

14 **(a)** The population of Italy is about 60 000 000

Write this population in standard form.

..... [1]

(b) The mass of a beetle is 0.0032 kg.

Write this mass in standard form.

..... kg [1]

15 A film is shown at a cinema at 2 pm and at 7 pm every day.
The diagram shows the number of people watching the film at 7 pm on 10 days.

2 pm						7 pm				
					0	5	7	8		
					1	1	3	5	9	9
				2	**2**	0	5			
					3					
					4					

Key : 2 | **2** | 0 represents 22 people watching at 2 pm and 20 people watching at 7 pm.

The number of people watching the film at 2 pm on these days is

32 25 18 37 ~~22~~ 43 27 31 34 28

(a) Complete the back-to-back stem-and-leaf diagram above to show the information for 2 pm.
One has been done for you.

[2]

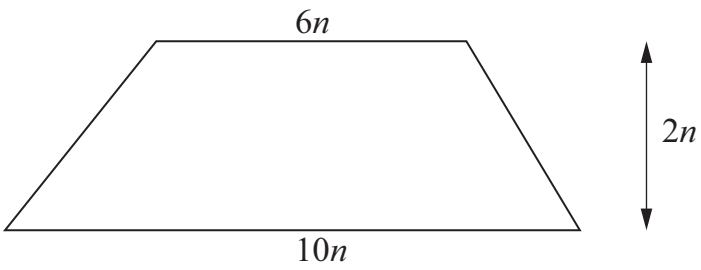
(b) Make one comparison between the number of people that watch the film at 7 pm and the number that watch at 2 pm.

.....

.....

..... [1]

16 The diagram shows a trapezium.
All dimensions are in centimetres.



NOT TO SCALE

Find an expression for the area of the trapezium.
Simplify your answer as much as possible.

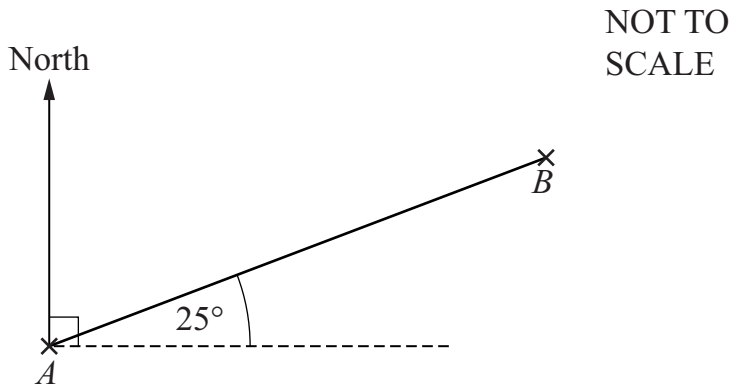
..... cm^2 [2]

17 Solve.

$$\frac{9}{x-5} = 6$$

$x =$ ..... [2]

18 The diagram shows the positions of two aeroplanes, A and B.



Naomi says,

'The bearing of B from A is 25°.'

Write down two criticisms of Naomi's statement.

Criticism 1 .....

.....

Criticism 2 .....

.....

[2]

19 Work out.

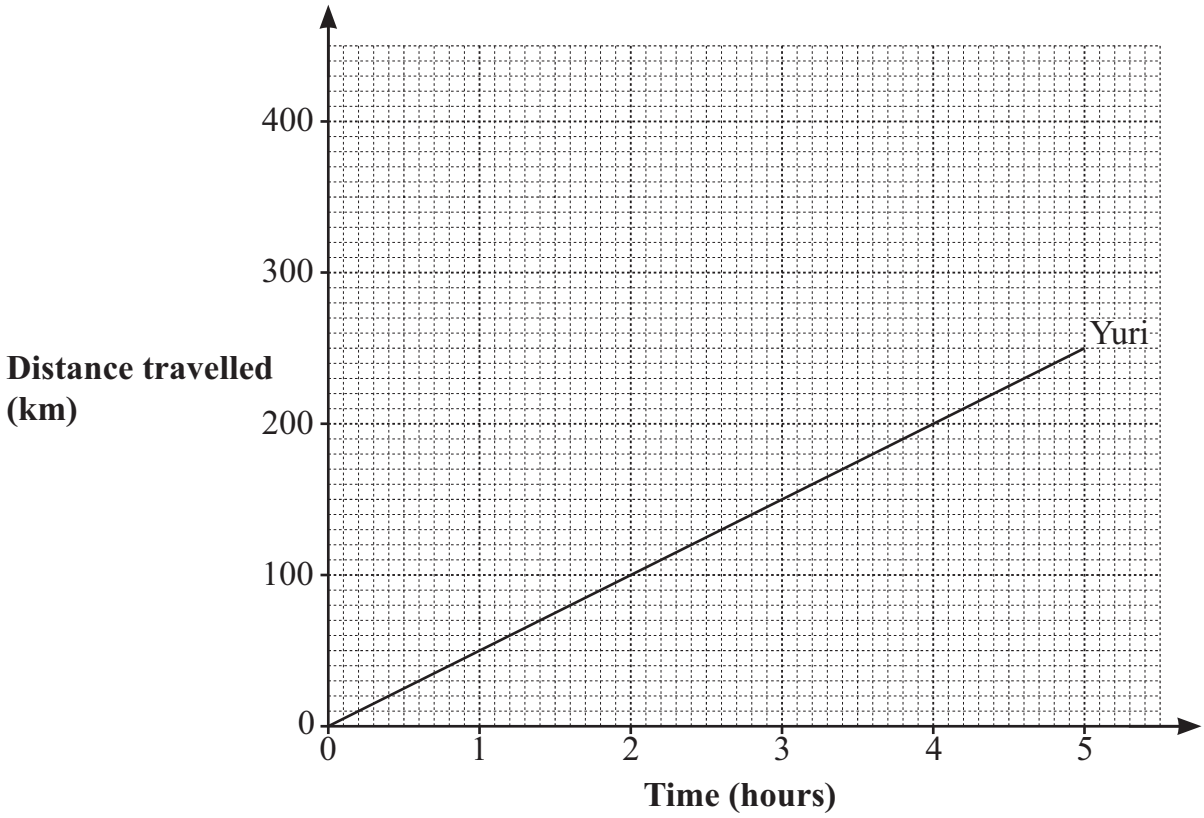
$$2\frac{2}{3} \div 1\frac{1}{5}$$

Give your answer as a mixed number in its simplest form.

..... [3]

20 Yuri and Mia each make a journey.

The travel graph shows Yuri's journey.



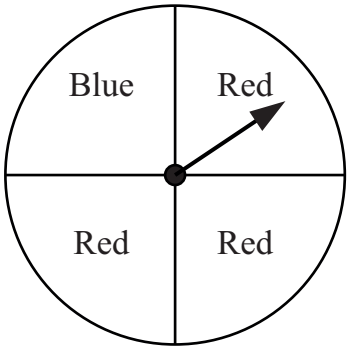
Mia starts her journey at the same time as Yuri.
Mia's journey lasts 2 hours less than Yuri's journey.
Mia's average speed is twice Yuri's average speed.

Draw a straight line on the travel graph to show Mia's journey.

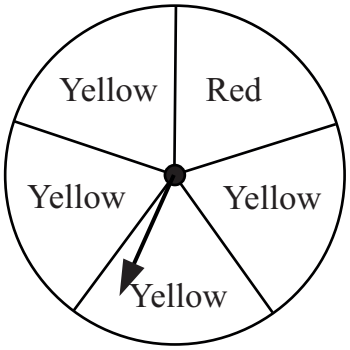
[2]

21 Chen has two fair spinners.

Spinner A

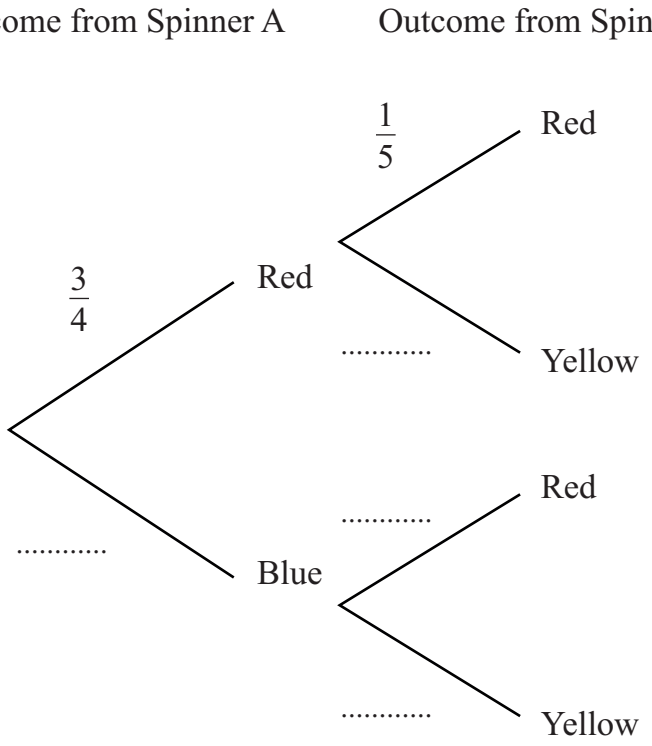


Spinner B



Chen spins both spinners.

(a) Complete the tree diagram.



[2]

(b) Calculate the probability that both spinners land on a **red** section.

..... [1]

22 A linear function maps input numbers to output numbers.

Complete the input-output table for this function.

Input	**Output**
1	4
2	10
5	28
10	
n	

[2]

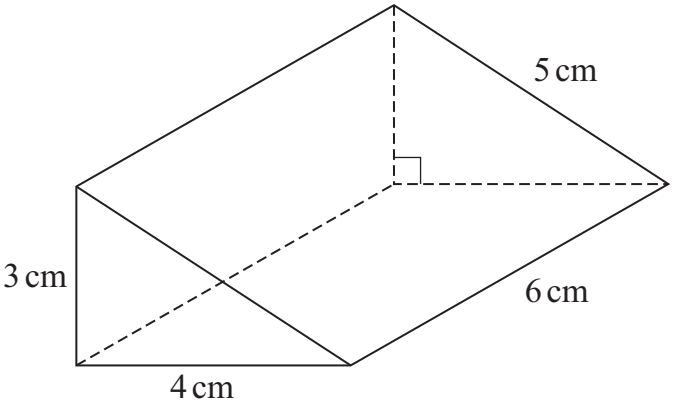
23 Use algebra to solve the simultaneous equations.

$$x - 2y = 13$$

$$2x + y = 11$$

$x =$ ..... $y =$ ..... [3]

24 The diagram shows a triangular prism.



NOT TO SCALE

The triangular faces are painted red.
The rectangular faces are painted blue.

Find the fraction of the surface area that is painted red.

..... [3]