Cambridge Secondary 1 Progression Test

Question paper

Cambridge Secondary 1

55 minutes

Mathematics Paper 2

Stage 9

Name .....

Additional materials: Ruler
Calculator
Tracing paper
Geometrical instruments

READ THESE INSTRUCTIONS FIRST

Answer **all** questions in the spaces provided on the question paper.

You should show all your working on the question paper.

The number of marks is given in brackets [ ] at the end of each question or part question.

The total number of marks for this paper is 45.

For Teacher's Use	
Page	**Mark**
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
Total	

V1

UNIVERSITY of CAMBRIDGE
International Examinations

For Teacher's Use

1 Look at the numbers.

397.36	76.75

(a) Write each number correct to one significant figure.

400 and 80 [1]

(b) Without working out the correct answer, estimate the value of 397.36 ÷ 76.75 correct to one significant figure.

You must show your working.

400 ÷ 80 = 5

5 [1]

2 Work out the values of x, y and z in these statements.

(a) $4^6 \times 4^x = 4^9$ $6 + x = 9$, $x = 9 - 6$ $x =$ 3 [1]

(b) $7^4 \div 7^6 = 7^y$ $y = 4 - 6$ $y =$ −2 [1]

(c) $5^z = 1$ $z =$ 0 [1]

3 Write a fraction in the box to make this calculation correct.

$$2\frac{3}{4} \times \boxed{1\frac{1}{2}} = 4\frac{1}{8}$$

$\frac{11}{4} \times x = \frac{33}{8}$ [2]

$x = \frac{33}{8} \times \frac{4}{11} = \frac{3}{2}$

For Teacher's Use

4 Samira buys a car.
The car loses 23% of its value in the first year. (v)
At the end of the first year her car is worth $6575.80

How much did Samira pay for her car?
Show your working.

$v - 23\%\, v = 6575.8$

$77\%\, v = 6575.8$

$v = 8540$

$ 8540 [2]

5 The exchange rate between the British pound (£) and the US dollar ($) is

£1 = $1.60

(a) Convert £75 into dollars.

75×1.6

$ 120 [1]

(b) Convert $75 into pounds.

$75 \div 1.6$

£ 46.875 [1]

6 Look at this calculation.

$$\frac{26.3 + 47.9}{107.4 - 3.29}$$

(a) Use your calculator to work out the answer.
Write down all of the figures on your display.

$\frac{74.2}{104.11} = 0.712707713$ [1]

(b) Write your answer correct to 3 decimal places.

0.713 [1]

For Teacher's Use

7 Tariq says that $\frac{1}{3}$ is the same as 33%.

Is Tariq correct?
Explain your answer.

Yes/No because $\frac{1}{3} \rightarrow \frac{1}{3} \times 100\% = 33.33333\%$

Not the same just round off / approximation [1]

8 Complete the boxes to make the calculation correct.

$$\frac{3x}{8} + \frac{\boxed{2x}}{4} = \frac{5x}{\boxed{8}}$$

[2]

9 Look at the equation.

$$3x - 2y - 5 = 17$$

Work out the values of

(a) $3x - 2y + 9$

$3x - 2y - 5 = 17$ (both sides added to 14)

$3x - 2y - 5 + 14 = 17 + 14$

$3x - 2y + 9 = 31$

31 [1]

(b) $9x - 6y$

$3(3x - 2y - 5) = 3 \times 17$

$9x - 6y - 15 = 51$

$9x - 6y = 51 + 15$

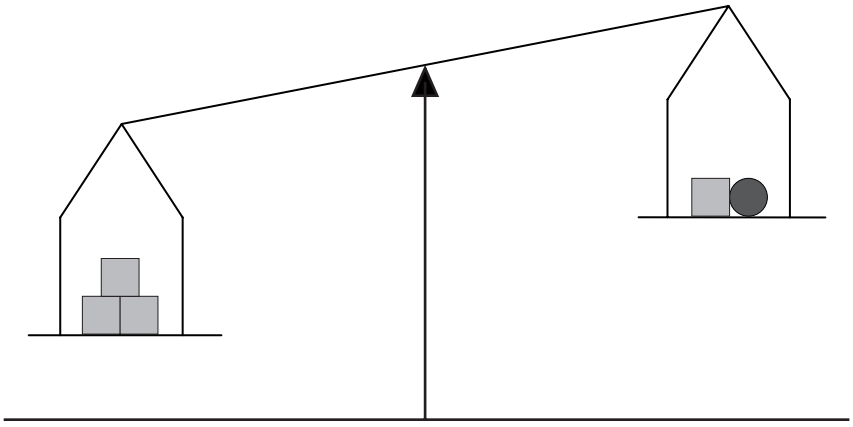
$= 66$

66 [1]

For Teacher's Use

10 Here is a balance.

Each ▢ has a mass of m kg.
The ● has a mass of 4 kg.



(a) Complete the inequality.

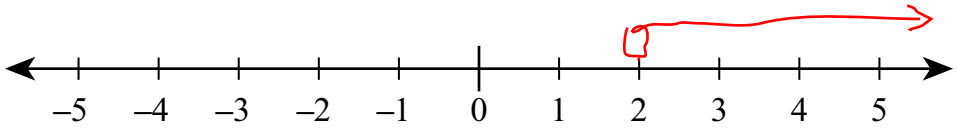
$3m$ ..... $m + 4$

[1]

(b) Solve the inequality and show the solution on the number line.

$3m - m > 4$ $\quad m > 2$

$2m > 4$



[2]

11 Factorise.

$4a^2 - 6ab$

$2a(2a - 3b)$

..... [1]

For Teacher's Use

12 The n^{th} term of a sequence is $3n + x$.
The fourth term is 17

(a) Work out the value of x.

$17 = 3(4) + x$

$17 = 12 + x$

$x = 5$

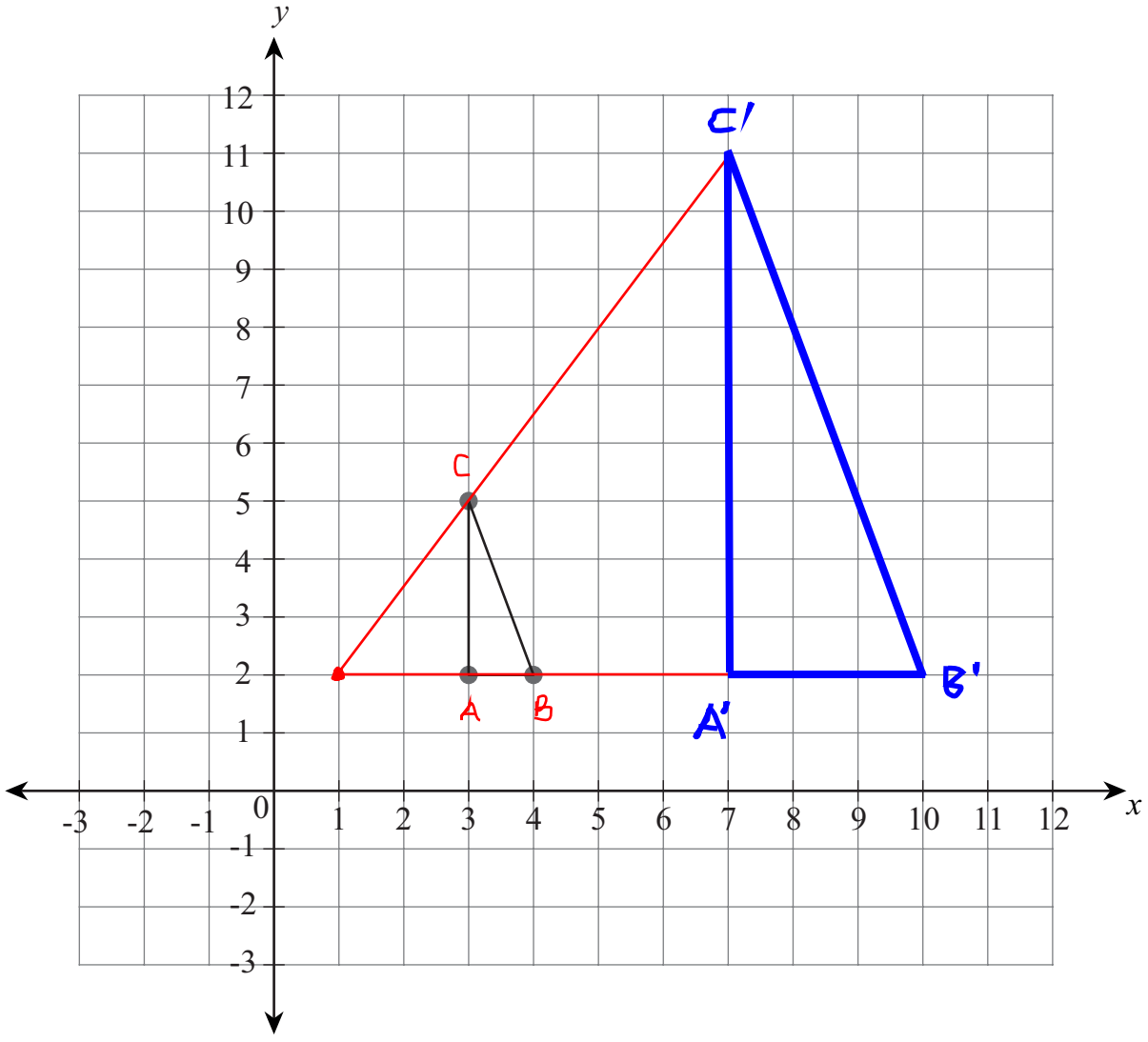
$x =$ 5 [1]

(b) What is the first term of the sequence?

$n = 1 \longrightarrow 3(1) + 5 = 8$

8 [1]

13 A triangle is drawn on the grid.

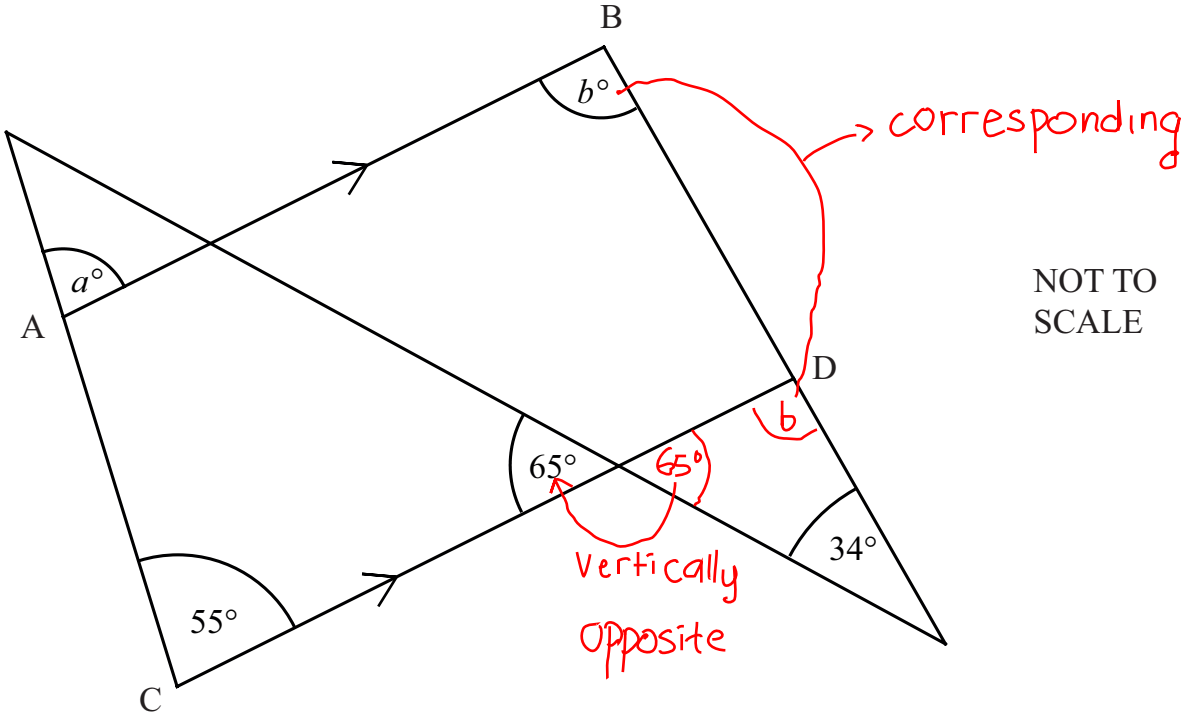


Enlarge the triangle with scale factor 3 and centre of enlargement (1, 2).

[2]

For Teacher's Use

14 Look at the diagram.
The lines AB and CD are parallel.



(a) (i) Write down the value of a.

$a =$ 55° [1]

(ii) Give a reason for your answer.

corresponding with 55° [1]

(b) Work out the value of b.

$b + 65 + 34 = 180$

$b + 99 = 180$

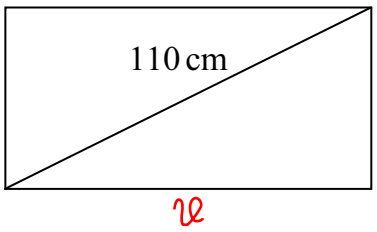
$b = 180 - 99$

$= 81$

$b =$ 81 [1]

For Teacher's Use

15 The diagonal of a rectangle is 110 cm.



NOT TO SCALE

The rectangle is 60 cm high.

How wide is the rectangle?
Give your answer to the nearest cm.

$w^2 + 60^2 = 110^2$

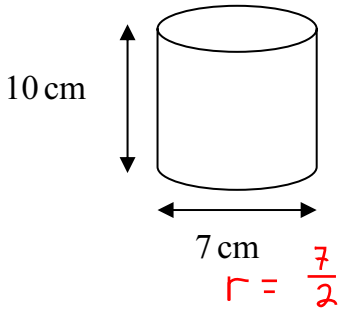
$w^2 = 12100 - 3600$

$= 8500$

$w = \sqrt{8500}$

92 ..... cm [2]

16 A tin of beans is a cylinder.
It has a base with a diameter of 7 cm and a height of 10 cm.



NOT TO SCALE

(a) Work out the **volume** of the tin.
Give your answer to the nearest cm³.

$V = \pi r^2 h$

$= \frac{22}{7} \times \frac{1}{2} \times \frac{7}{2} \times 10^{5}$

$= 385$

385 ..... cm³ [2]

For Teacher's Use

(b) The label on the tin covers all of the curved surface.
It has no overlap.
When removed from the tin the label is a rectangle.

NOT TO SCALE

length of the rectangle = circumference of the base

Work out the **area** of the label.
Give your answer to the nearest cm^2.

$l = 2\pi r = 2 \times \frac{22}{7} \times \frac{7}{2} = 22$ cm

$A = l \times w = 22 \times 10$

$= 220$

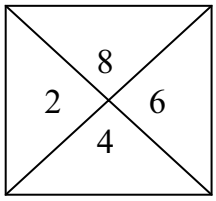
220 ..... cm^2 [2]

For Teacher's Use

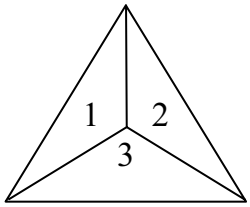
17 A and B are fair spinners.

The diagrams show their faces.

A



B



(a) Complete the sample space diagram to show all the possible outcomes of spinning the triangular and the square spinner.

Spinner B

Spinner A		1	2	3
	2	(2, 1) O	(2, 2) E	(2, 3) O
	4	(4, 1) O	(4, 2) E	(4, 3) O
	6	(6, 1) O	(6, 2) E	(6, 3) O
	8	(8, 1) O	(8, 2) E	(8, 3) O

O = Odd total (add up = odd number)

E = Even

[1]

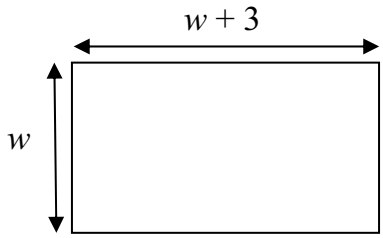
(b) What is the probability of scoring an **odd total** when the numbers on the two spinners are added?

$\frac{8}{12} = \frac{2}{3}$

$\frac{2}{3}$ [1]

For Teacher's Use

18 The length of a rectangle is 3 cm longer than its width (w).



The area of the rectangle is 30 cm².

Work out the width of the rectangle.
Give your answer correct to 1 decimal place.

$w(w+3) = 30$

$w^2 + 3w = 30$

$w^2 + 3w - 30 = 0$ → Can't factorize !

Use abc formula !

$$w = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$$= \frac{-3 \pm \sqrt{9+120}}{2}$$

$$w = \frac{-3 \pm \sqrt{129}}{2}$$

OR use trial & error

w	w+3	w(w+3)
4	7	28
3	6	18
5	8	40
4.1	7.1	29.11
4.2	7.2	30.24

$w =$ 4.2 cm [3]

19 Michel is carrying out a survey to find out how much time students spend watching TV.
He designs a questionnaire.
This is one of the questions.

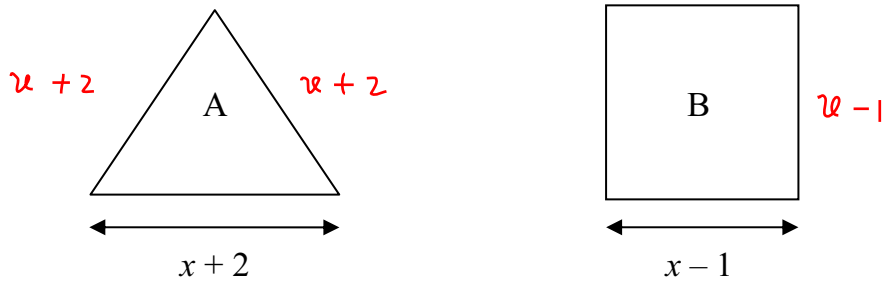
> How many hours do you spend watching TV per week?
> Please tick.
>
> ☐ 1 to 5 ☐ 5 to 10 ☐ 10 to 20 ☐ More than 20

Make **two** criticisms of Michel's question.

- Better if per day, more specific
- The question is too direct. If he wants to give some questions to identify time consuming for watching TV, the question should not too direct [2]

For Teacher's Use

20 Shape A is an equilateral triangle.
Shape B is a square.



The perimeters of A and B are equal.

Work out the lengths of the sides of shapes A and B.
You must show your working

$P_A = x + 2 + x + 2 + x + 2 = 3x + 6$

$P_B = (x - 1) \times 4 = 4x - 4$

$P_A = P_B$

$3x + 6 = 4x - 4$

$6 + 4 = 4x - x$

$10 = x$

Length of sides of A $x + 2 = 12$ cm

Length of sides of B $x - 1 = 9$ cm [3]