Cambridge Secondary 1 Progression Test
Question paper

55 minutes

Mathematics Paper 2

Stage 9

For Teacher's Use	
Page	Mark
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Total	

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.

V1

UNIVERSITY *of* CAMBRIDGE
International Examinations

1 Look at the numbers.

$$397.36 \qquad 76.75$$

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

<u>400</u> and <u>80</u> [1]

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

You must show your working.

$400 \div 80 = 5$

<u>5</u> [1]

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

$6 + x = 9$

(a) $4^6 \times 4^x = 4^9$ $x = 9 - 6$ $x =$ <u>3</u> [1]

(b) $7^4 \div 7^6 = 7^y$ $y = 4 - 6$ $y =$ <u>-2</u> [1]

(c) $5^z = 1$ $z =$ <u>0</u> [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]

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

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

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

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

$77\% \, x = 6575.8$

$x = 8540$

$ \underline{\quad 8540 \quad}$ [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

$ \underline{\quad 120 \quad}$ [1]

(b) Convert $75 into pounds.

$75 \div 1.6$

£ $\underline{\quad 46.875 \quad}$ [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.

$\underline{\quad 0.713 \quad}$ [1]

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.

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

[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) $9x - 6y$

$3(3x - 2y - 5) = 3 \times 17$
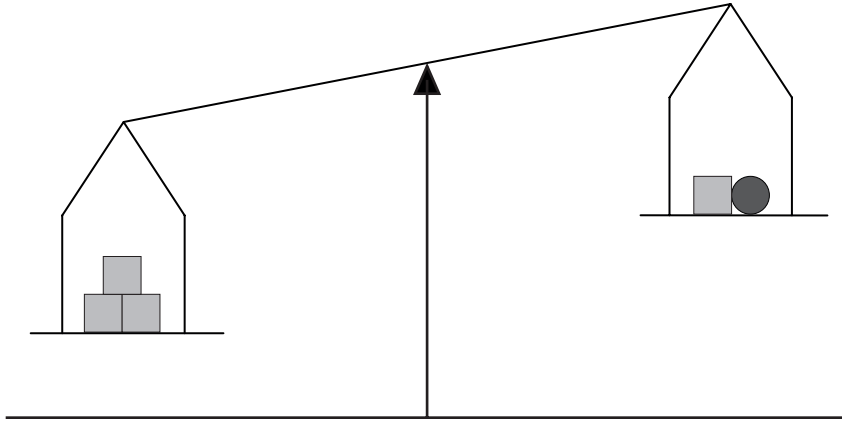
$9x - 6y - 15 = 51$ 66 [1]

$9x - 6y = 51 + 15$

$= 66$

10 Here is a balance.

Each ☐ has a mass of m kg.
The ⚫ has a mass of 4 kg.

(a) Complete the inequality.

$$3m \;\underset{>}{}\; m + 4$$

[1]

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

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

[2]

11 Factorise.

$$4a^2 - 6ab$$

$2a(2a - 3b)$

.... [1]

12 The nth term of a sequence is $3n + x$.
The fourth term is 17

(a) Work out the value of x.
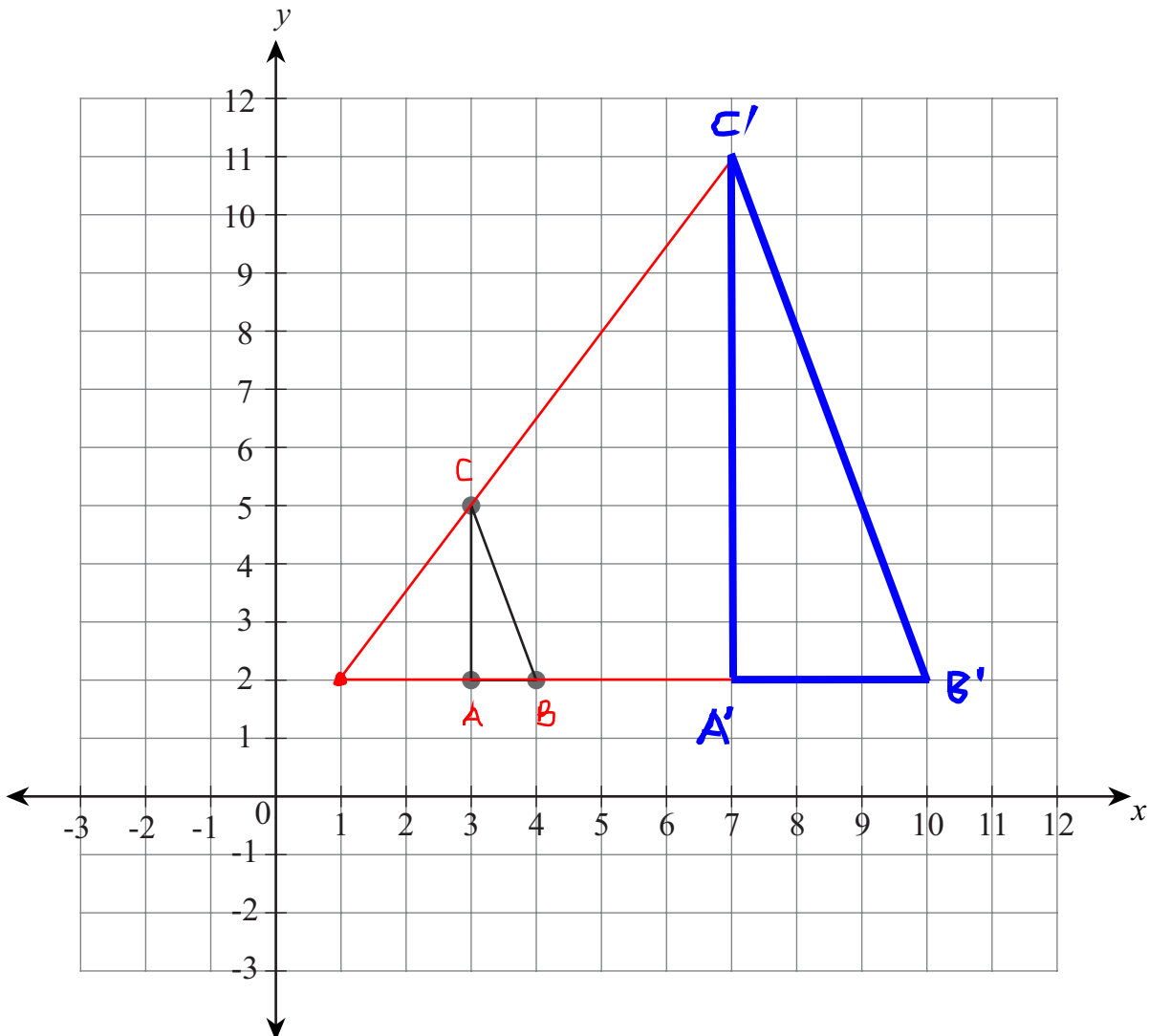
$17 = 3(4) + x$

$17 = 12 + x$

$x = 5$

$x =$ .... 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.
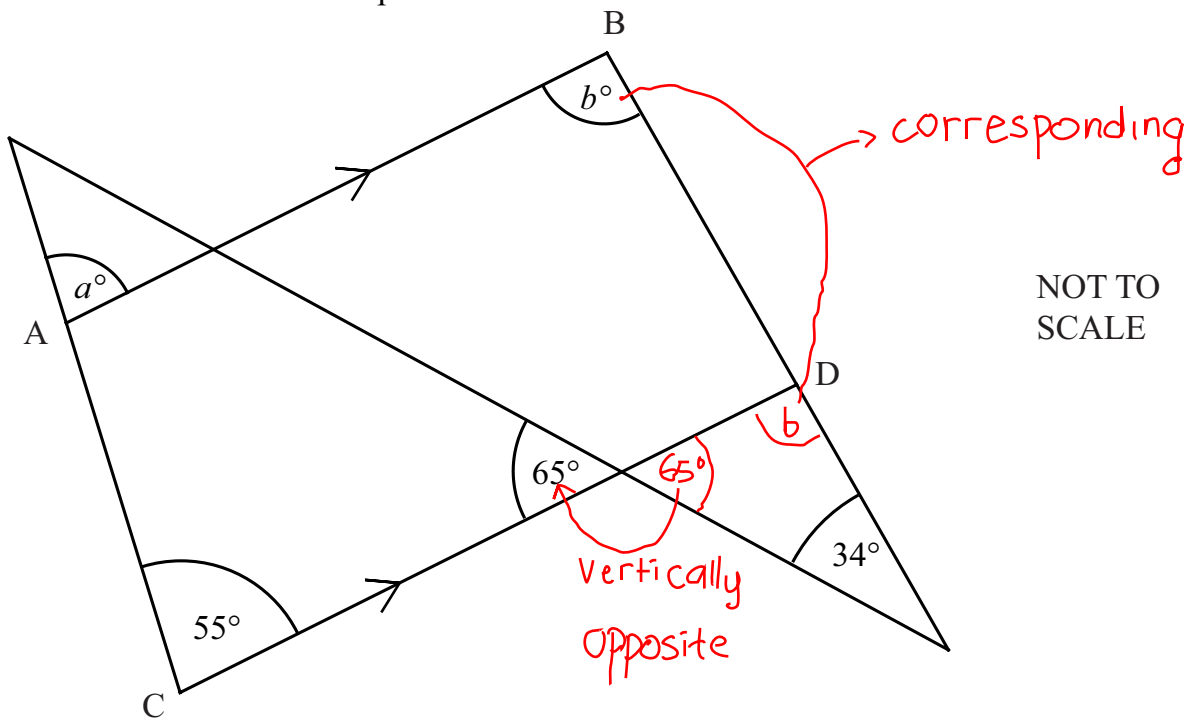

Enlarge the triangle with scale factor 3 and centre of enlargement $(1, 2)$.

[2]

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

B

b°

corresponding

NOT TO
SCALE

A

a°

D

b

65° 65°

34°

Vertically

Opposite

55°

C

(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]

15 The diagonal of a rectangle is 110 cm.
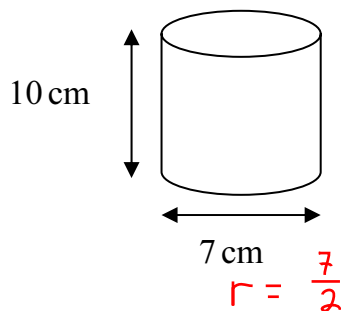
110 cm   60 cm   NOT TO SCALE

w
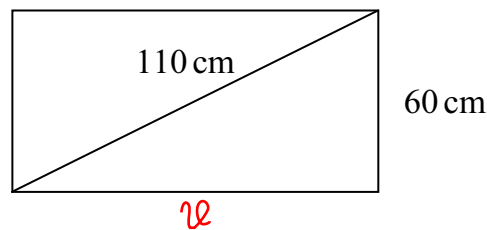
The rectangle is 60 cm high.

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.
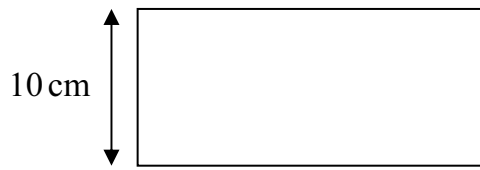It has a base with a diameter of 7 cm and a height of 10 cm.

10 cm   NOT TO SCALE

7 cm $r = \dfrac{7}{2}$

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

$$V = \pi r^2 h$$

$$= \frac{\overset{11}{22}}{7} \times \frac{7}{2} \times \frac{7}{2} \times \overset{5}{10}$$

$$= 385$$

385 cm³   [2]

(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.

10 cm

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.

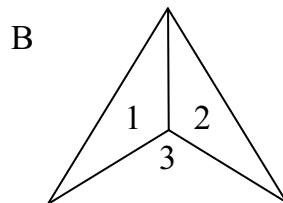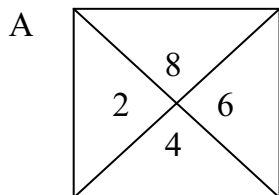$$\ell = 2\pi r = 2 \times \frac{22}{7} \times \frac{7}{2} = 22 \text{ cm}$$

$$A = \ell \times w = 22 \times 10$$
$$= 220$$

220 .... cm^2 [2]

17 A and B are fair spinners.

The diagrams show their faces.

A

| 8 |
| 2 × 6 |
| 4 |

B

1 | 2
3

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

Spinner B

	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

Spinner A
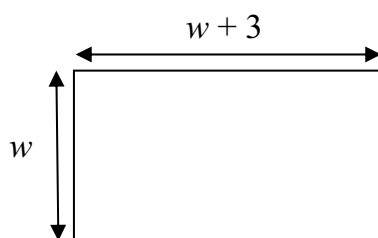
O = Odd total
(add up = odd number)

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]

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

$w + 3$

w

The area of the rectangle is 30 cm².

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

$w(w+3) = 30$

$w^2 + 3w = 30$

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

Use abc formula !

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

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

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

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

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?
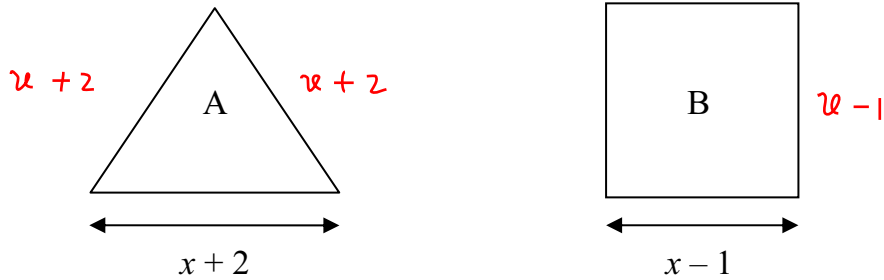Please tick.

☐   ☐   ☐   ☐
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   [2]

give some questions to identify time consuming for watching TV, the question should not too direct

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

$x + 2$ (left of triangle A) $x + 2$ (right of triangle A)

B $x - 1$

$x + 2$

$x - 1$

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]