



Surname _____

Other Names _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

GCSE

MATHEMATICS

H

Higher Tier Paper 1 Non-Calculator

8300/1H

Tuesday 21 May 2019 Morning

Time allowed: 1 hour 30 minutes

At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]

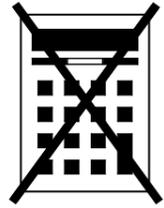


JUN1983001H01

For this paper you must have:

- **mathematical instruments**

You must NOT use a calculator.



INSTRUCTIONS

- **Use black ink or black ball-point pen. Draw diagrams in pencil.**
- **Answer ALL questions.**
- **You must answer the questions in the spaces provided. Do not write on blank pages.**
- **Do all rough work in this book. Cross through any work you do not want to be marked.**



INFORMATION

- **The marks for questions are shown in brackets.**
- **The maximum mark for this paper is 80.**
- **You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.**

ADVICE

In all calculations, show clearly how you work out your answer.

DO NOT TURN OVER UNTIL TOLD TO DO SO

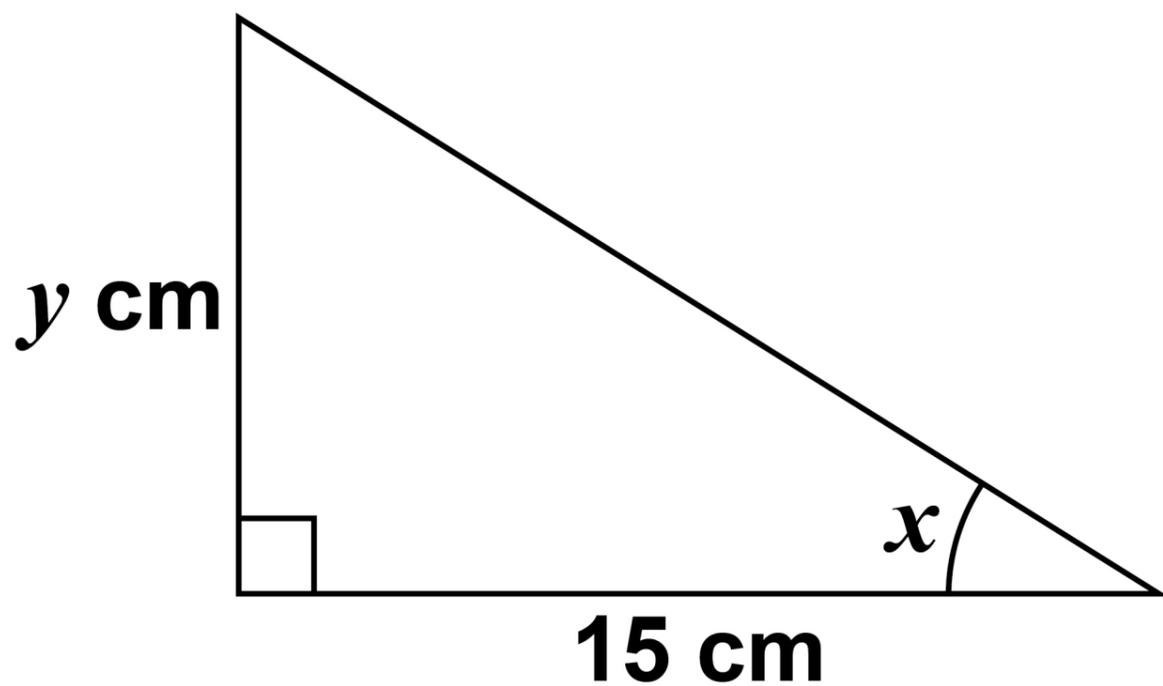
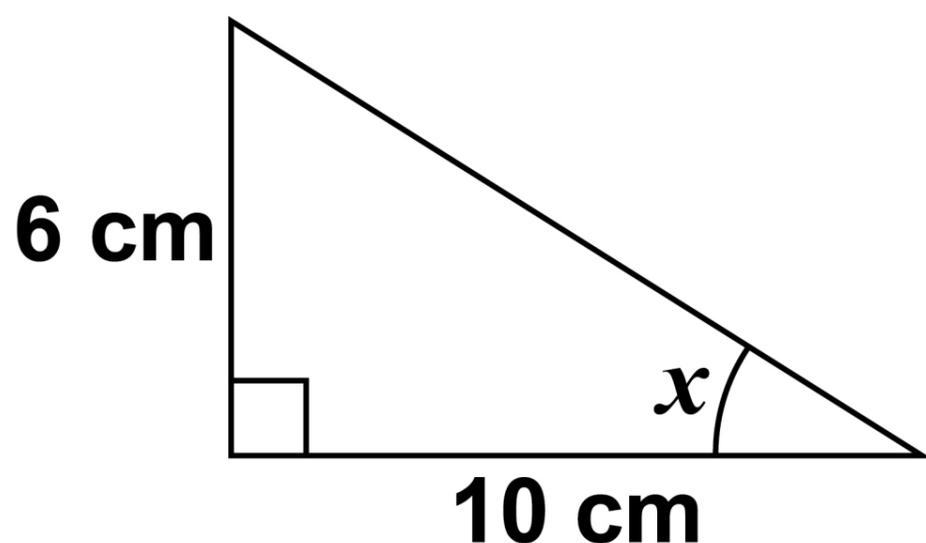


Answer ALL questions in the spaces provided.

1

Here are two right-angled triangles.

They are not drawn accurately.



5

Circle the value of y . [1 mark]

11

7.5

9

4

2

Work out the value of $\left(1\frac{2}{3}\right)^2$

Circle your answer. [1 mark]

$1\frac{4}{9}$

$3\frac{1}{3}$

$2\frac{4}{9}$

$2\frac{7}{9}$

3

Work out the arc length, in metres, of a semicircle of radius 6 metres.

Circle your answer. [1 mark]

3π

6π

12π

18π

[Turn over]



4

Circle the fraction that is equivalent to 4.625

[1 mark]

$$\frac{39}{8}$$

$$\frac{37}{8}$$

$$\frac{185}{4}$$

$$\frac{17}{4}$$

5 (a)

Write 0.000 97 in standard form.
[1 mark]

Answer _____



6

Anna plays a game with an ordinary, fair dice.

If she rolls 1 she wins.

If she rolls 2 or 3 she loses.

If she rolls 4, 5 or 6 she rolls again.

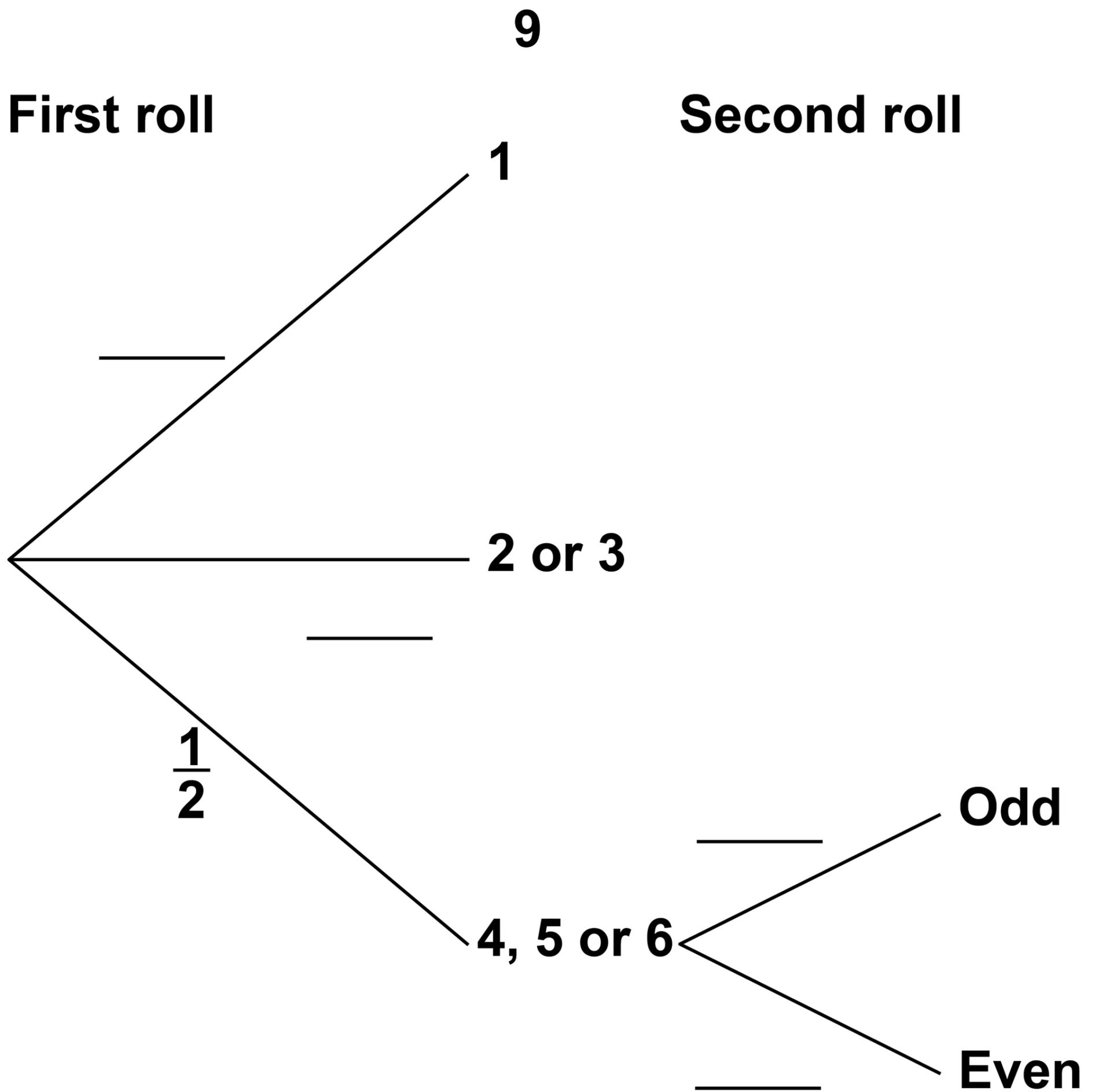
When she has to roll again,

if she rolls an odd number she wins

if she rolls an even number she loses.

6 (a)

Complete the tree diagram on the opposite page with the four missing probabilities. [2 marks]



[Turn over]



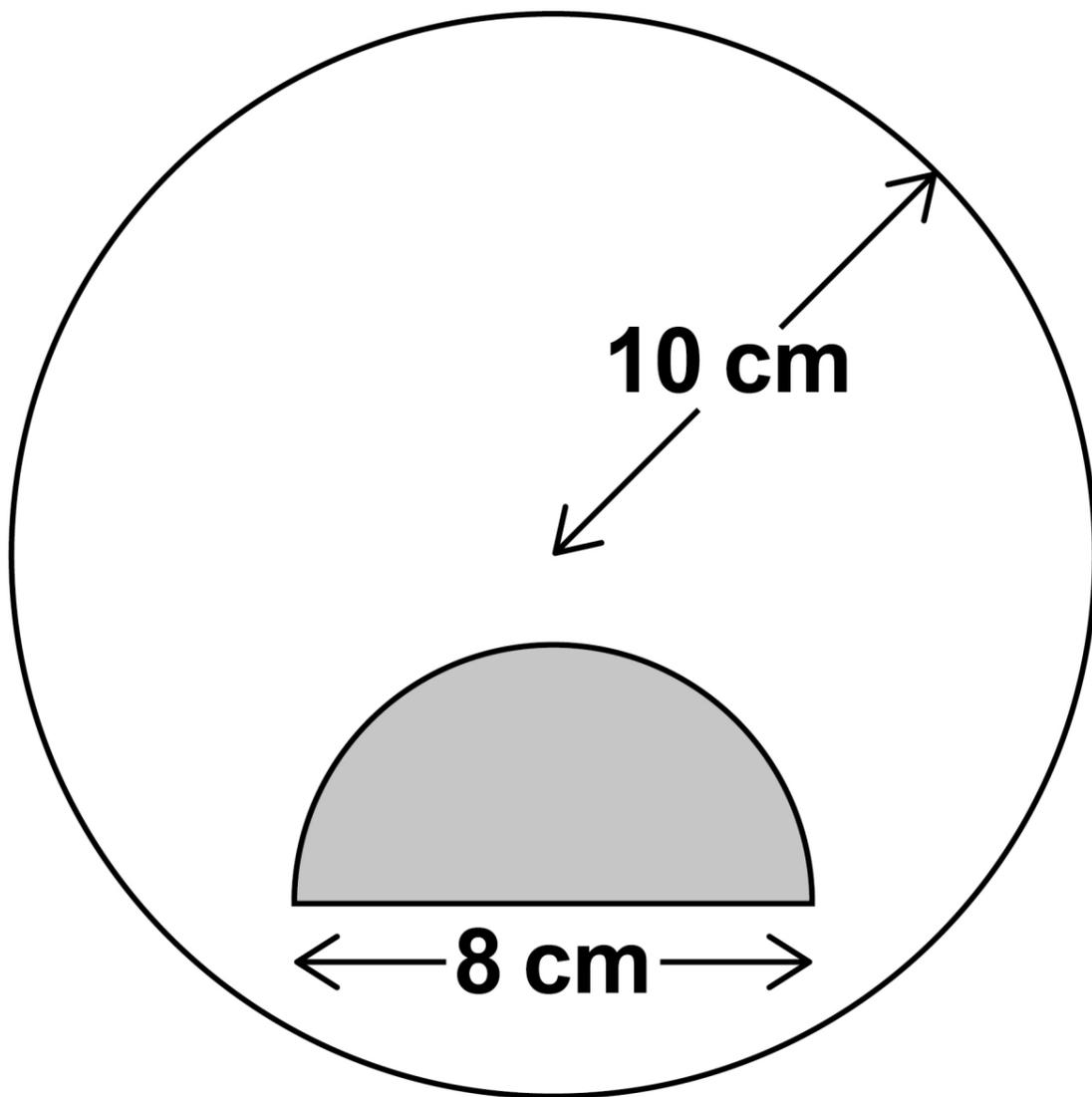
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9

A shaded semicircle is inside a circle as shown.

It is not drawn accurately.



The RADIUS of the circle is 10 cm

The DIAMETER of the semicircle is 8 cm



10

The number of items, n , made in 1 hour by a machine is given by

$$n = \frac{60}{t}$$

t is the time in minutes the machine takes to make one item.

The value of t changes for different types of item.

10 (a)

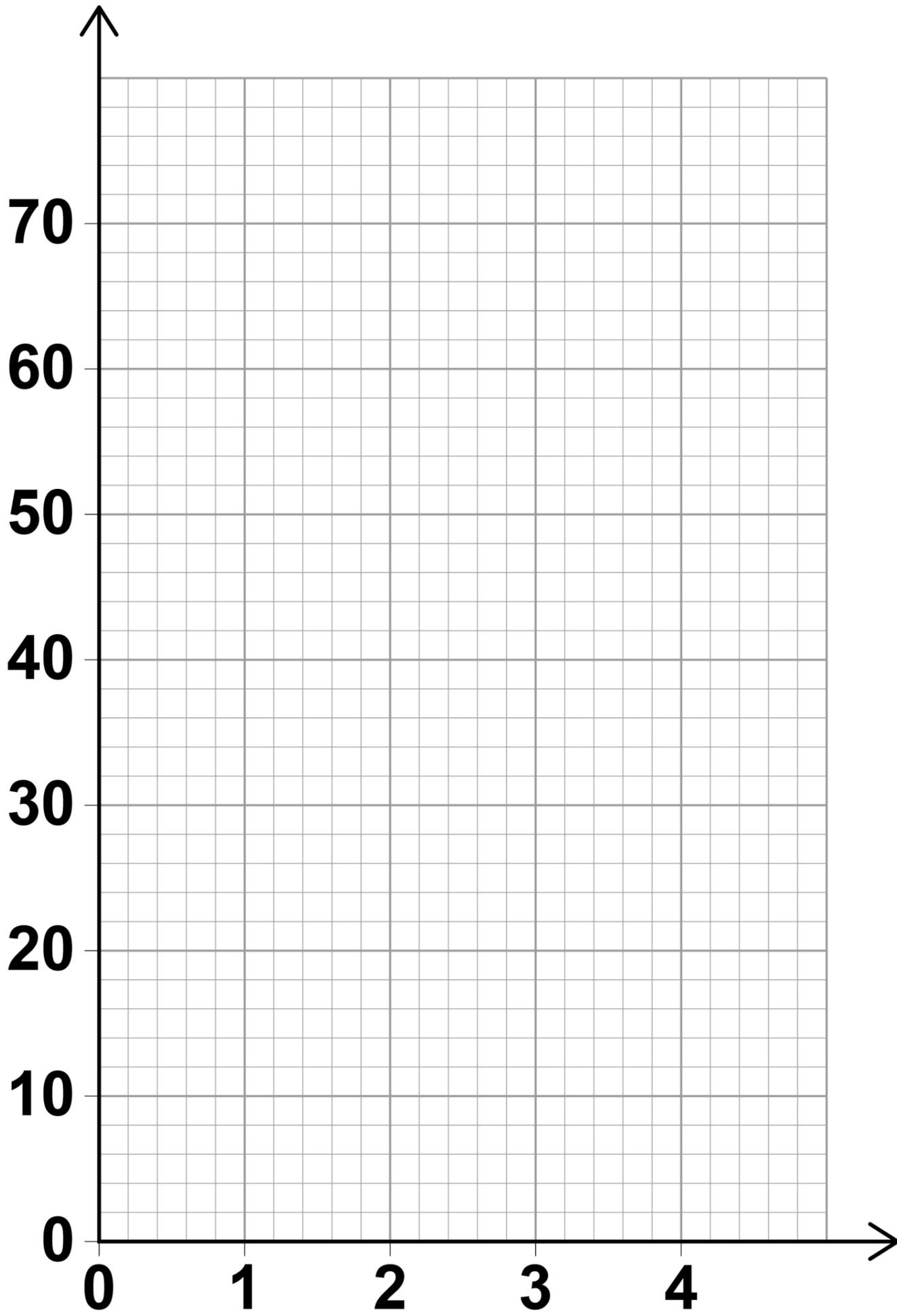
On the grid opposite, draw the graph

of $n = \frac{60}{t}$ for values of t from 1 to 4

[2 marks]



**Number of items, n ,
made in 1 hour**



**Time, t , (minutes)
to make one item**

[Turn over]



BLANK PAGE



10 (b)

The machine takes 3 minutes 30 seconds to make one item.

USE YOUR GRAPH, on page 17, to estimate the value of n . [2 marks]

Answer _____

[Turn over]

12

The next term of a sequence is made by adding the previous two terms.

Which of these sequences follows this rule?

Circle your answer. [1 mark]

-9 2 -7 -5 -12

-3 5 -2 3 1

0 -3 -3 0 -3

-1 -1 -2 -3 1

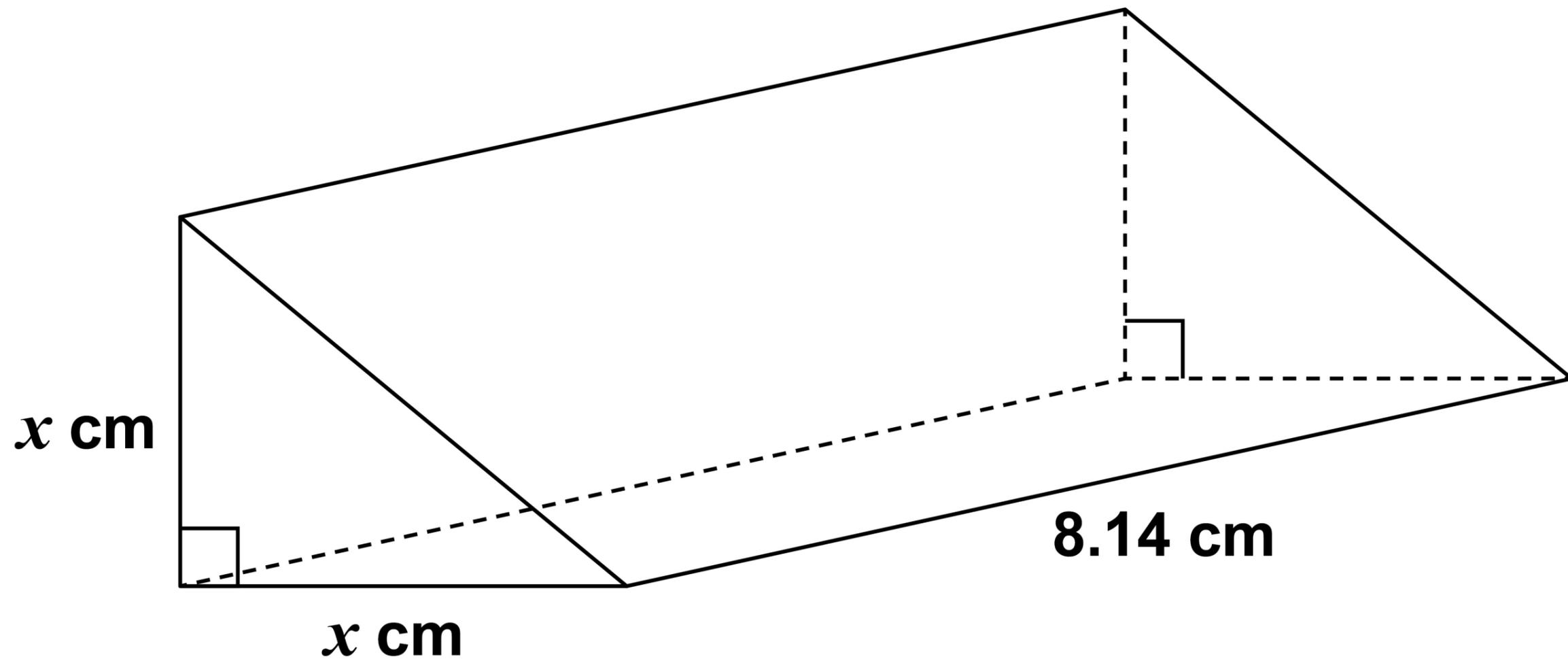
[Turn over]

8



13

The triangular cross section of a prism is an isosceles right-angled triangle.



22

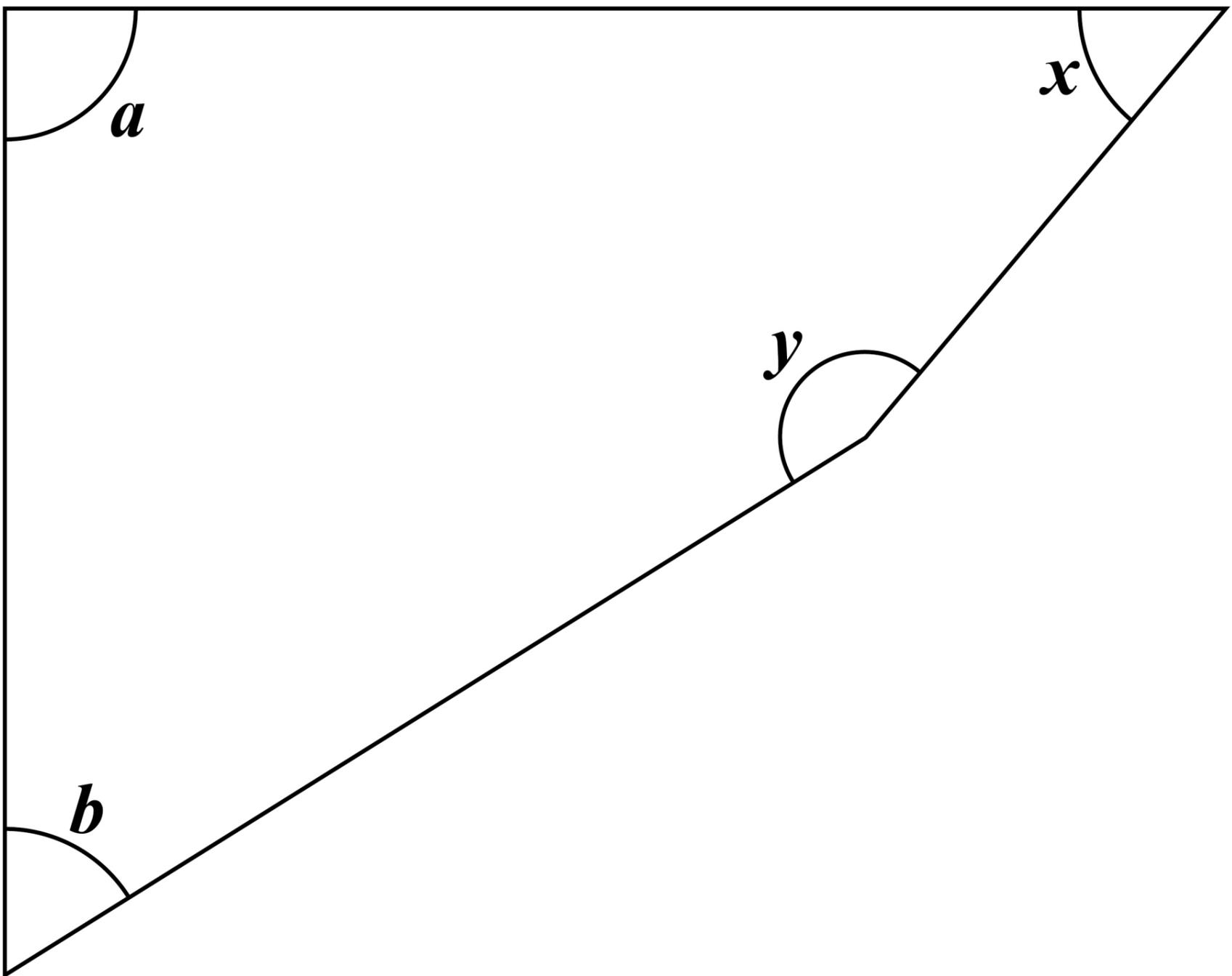
The volume of the prism is 102 cm^3



14

Here is a quadrilateral.

It is not drawn accurately.



$$a = 90^\circ \text{ and } a : b = 5 : 3$$

$$x : y = 1 : 3$$



15

Here is some information about the test marks of 120 students.

Mark, m	Frequency
$0 < m \leq 10$	20
$10 < m \leq 20$	28
$20 < m \leq 30$	40
$30 < m \leq 40$	20
$40 < m \leq 50$	12

15 (a)

Complete the cumulative frequency table.
[1 mark]

Mark, m	Cumulative frequency
$m \leq 10$	20
$m \leq 20$	48
$m \leq 30$	
$m \leq 40$	
$m \leq 50$	

15 (b)

Draw a cumulative frequency graph on page 29. [2 marks]

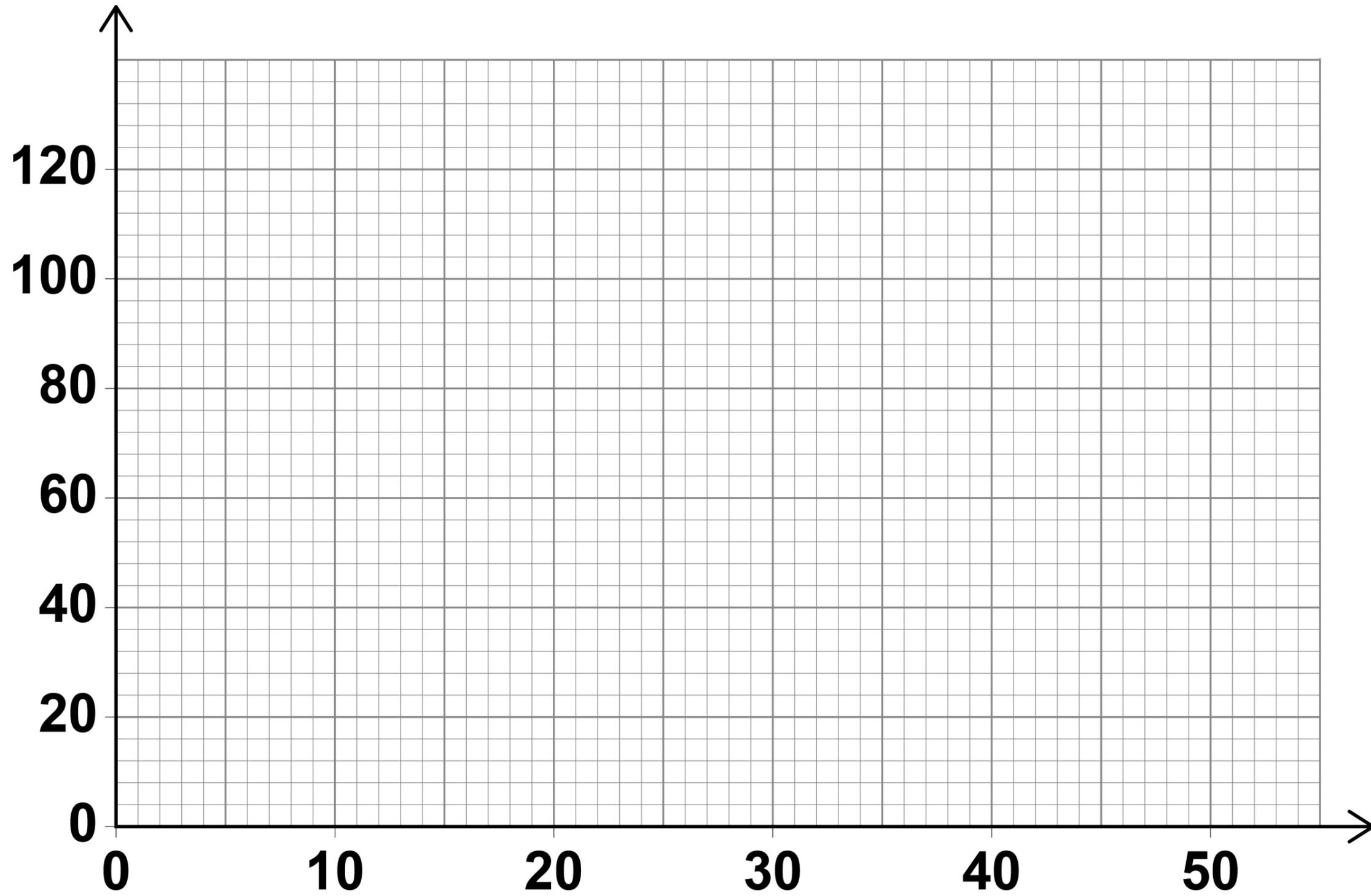
[Turn over]



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**Cumulative
frequency**



Mark, m

[Turn over]



2 9

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15 (c)

Students who scored 15 marks or fewer take another test.

Use your graph, on page 29, to estimate how many students take another test. [2 marks]

Answer _____

[Turn over]



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17

Toby is forming and solving equations.

17 (a)

The product of half of a number and three more than the number

is the same as

the square of the number

Toby uses y to represent the number.

Write an equation that Toby could form.

[2 marks]

Answer _____

17 (b)

Toby forms another equation.

$$x = \frac{9}{8x}$$

He wants to work out the values of x .

Here is his working.

$$\begin{aligned}x &= \frac{9}{8x} \\8x^2 &= 9 \\8x &= 3 \quad \text{or} \quad 8x = -3 \\x &= \frac{3}{8} \quad \text{or} \quad x = -\frac{3}{8}\end{aligned}$$

What error has he made in his working?
[1 mark]



[Turn over]

18

Here is an identity.

$$x^2 - y^2 \equiv (x + y)(x - y)$$

18 (a)

Use the identity to work out the value of
 $193^2 - 7^2$

You **MUST** show your working. [2 marks]

Answer _____

18 (b)

Factorise $100a^2 - 81b^2$

[1 mark]

Answer _____

19

Circle the fraction that is equivalent to $0.\dot{1}$

[1 mark]

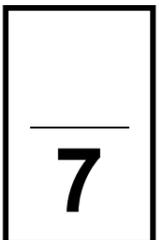
$$\frac{1}{9}$$

$$\frac{1}{99}$$

$$\frac{1}{10}$$

$$\frac{11}{100}$$

[Turn over]

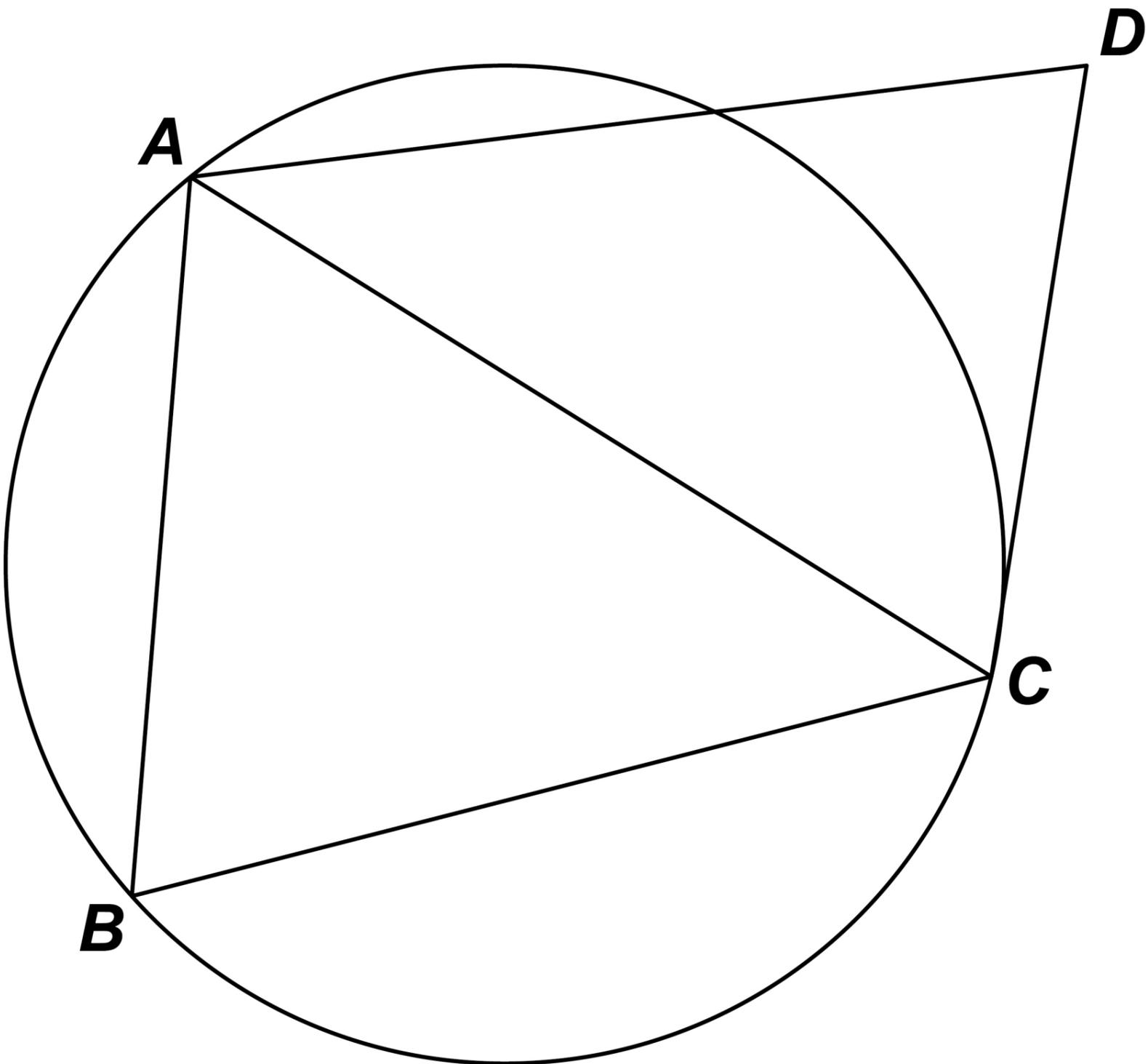


20

A, *B* and *C* are points on a circle.

CD is a tangent.

The diagram is not drawn accurately.



20 (b)

In fact, triangle ABC is equilateral.

Tick the TWO boxes for the statements that MUST be correct. [1 mark]

AB is parallel to DC

AC bisects angle BCD

AC bisects angle BAD

21

Solve the simultaneous equations

$$2x + 3y = 5p$$

$$y = 2x + p$$

where p is a constant.

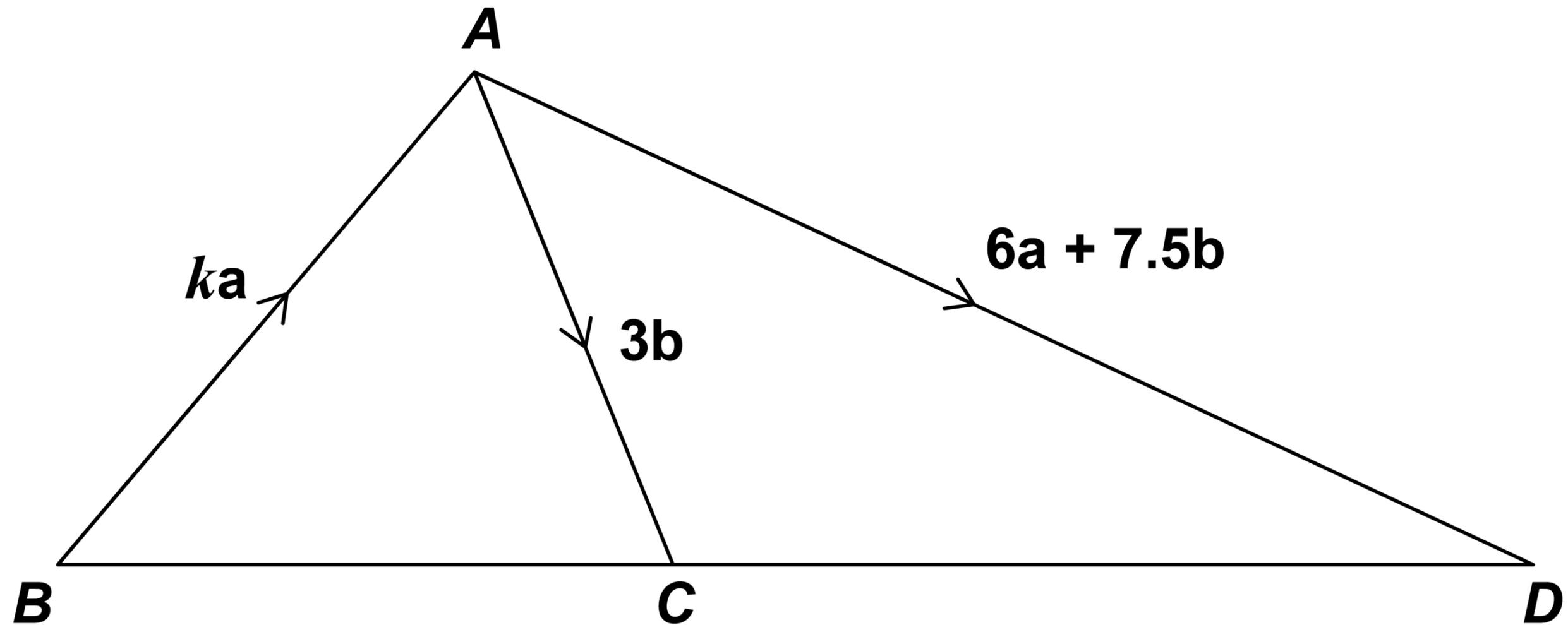


22

ABC and ACD are triangles.

k is a constant.

The diagram is not drawn accurately.



42



22 (a)

Show that $\vec{CD} = 6a + 4.5b$

[1 mark]

43

[Turn over]



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22 (b)

***BCD* is a straight line.**

Work out the value of *k*.

You MUST show your working. [3 marks]

Answer _____

[Turn over]



24

$$f(x) = \sin(x - 90^\circ)$$

Circle the value of $f(0^\circ)$

[1 mark]

1

0

 $-\frac{1}{2}$

-1

8

[Turn over]

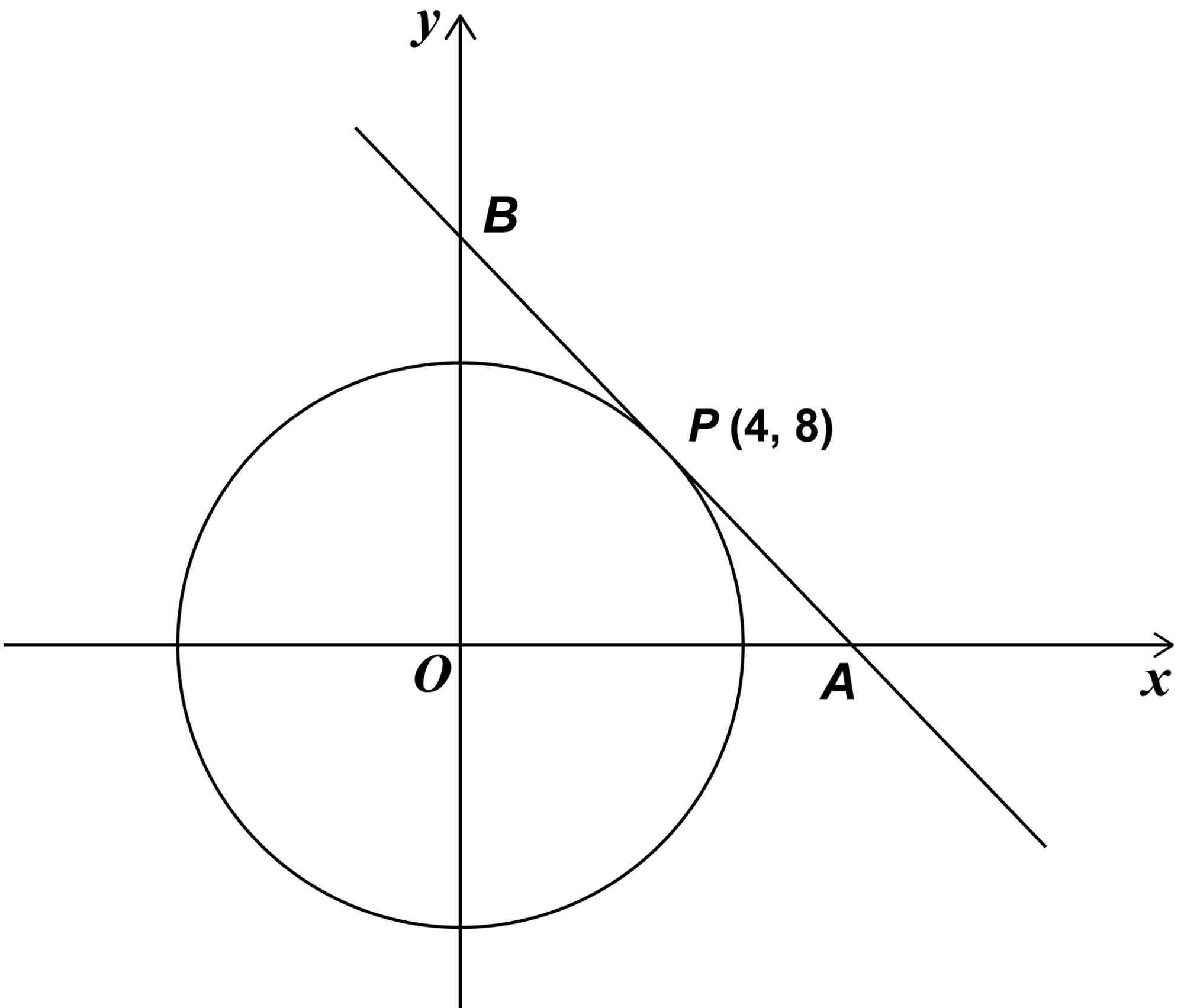


25

$P(4, 8)$ is a point on a circle, centre O .

The tangent at P intersects the axes at points A and B .

The diagram is not drawn accurately.



25 (a)

Show that the gradient of the tangent is

$$-\frac{1}{2}$$

[2 marks]

[Turn over]



Answer _____ **units**

6

[Turn over]

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For Examiner's Use	
Pages	Mark
4–7	
8–11	
12–15	
16–21	
22–25	
26–33	
34–37	
38–41	
42–47	
48–51	
52–53	
TOTAL	

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