

Dr Oliver Mathematics
AQA GCSE Mathematics
2016 November Paper 1: Non-Calculator
1 hour 30 minutes

The total number of marks available is 70.

You must write down all the stages in your working.

1. Solve

$$5w - 3 = 3w + 15.$$

(3)

2. A spinner has four sections A , B , C , and D .

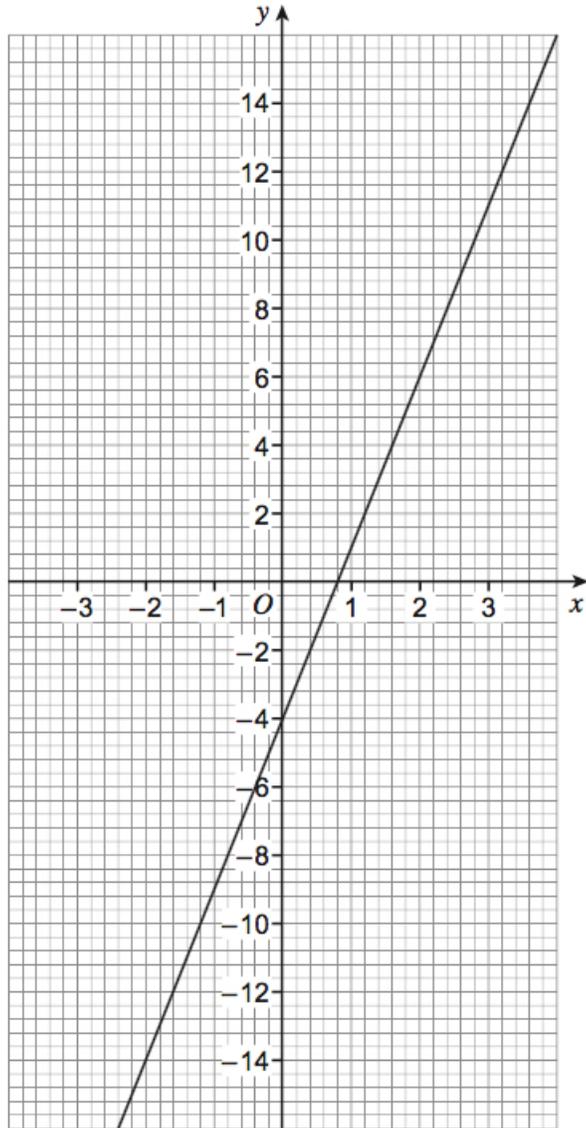
The table shows the probabilities of the spinner landing on A , B , or C .

(2)

Outcome	A	B	C	D
Probability	0.2	0.3	0.15	

Work out the probability of landing on D .

3. Here is a straight-line graph.

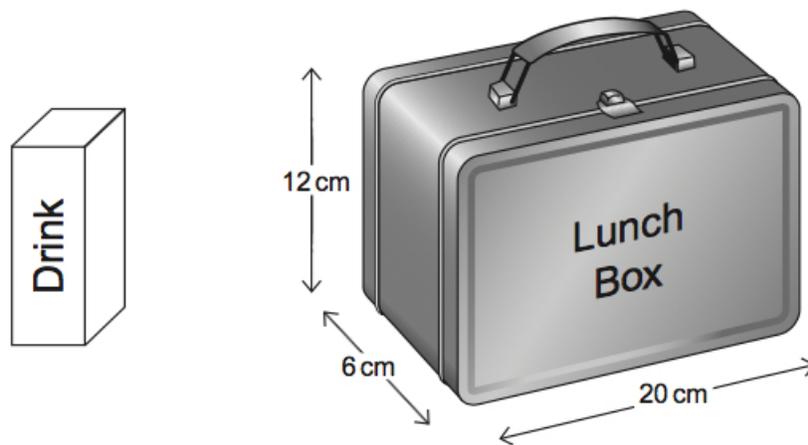


- (a) Use the graph to work out the value of x when $y = 8$. (1)
- (b) Work out the gradient of the line. (3)
4. Expand and simplify $6(x - 3) - 4(x - 5)$. (3)
5. Draw a diagram to show this data. (3)

Height, h , (cm)	Frequency
$5 < h \leq 10$	4
$10 < h \leq 15$	9
$15 < h \leq 20$	12
$20 < h \leq 25$	5

6. Here is a drink container and a lunch box.

(4)

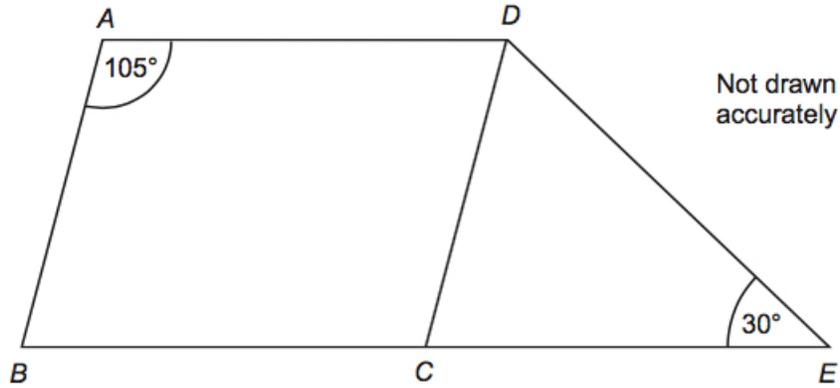


The drink container is a cuboid with a square base.
 The area of the base is 25 cm^2 .
 The volume of the container is 400 cm^3 .

Will the container fit inside the lunch box?
 You must show your working.

7. A parallelogram $ABCD$ and a triangle DCE are joined as shown.
 BCE is a straight line.

(4)



Show that DCE is an isosceles triangle.
You **must** show your working.

8. Field A is a rectangle with sides of 30 m and 70 m. (4)

Field B is a square with the same **perimeter** as Field A .



How much bigger in area is Field B than Field A ?
You **must** show your working.

9. Here are the first five terms of a linear sequence. (2)

9 15 21 27 33 ...

Work out the n th term.

10. Factorise (1)

$$x^2 - 100.$$

11. (a) Work out (2)

$$(2 \times 10^6) \times (8 \times 10^4).$$

Give your answer in standard form.

(b) Work out

(2)

$$\frac{2 \times 10^6}{8 \times 10^4}$$

Give your answer as an ordinary number.

12. Solve

(4)

$$2x + 3 + \frac{4x - 1}{2} = 10.$$

Do **not** use trial and improvement.

13. A park ranger wants to estimate the number of fish in a lake.

(3)

She catches 400 fish.

She marks them with ink and puts them back in the lake.

The next day she catches 60 fish.

There are 3 marked with ink.

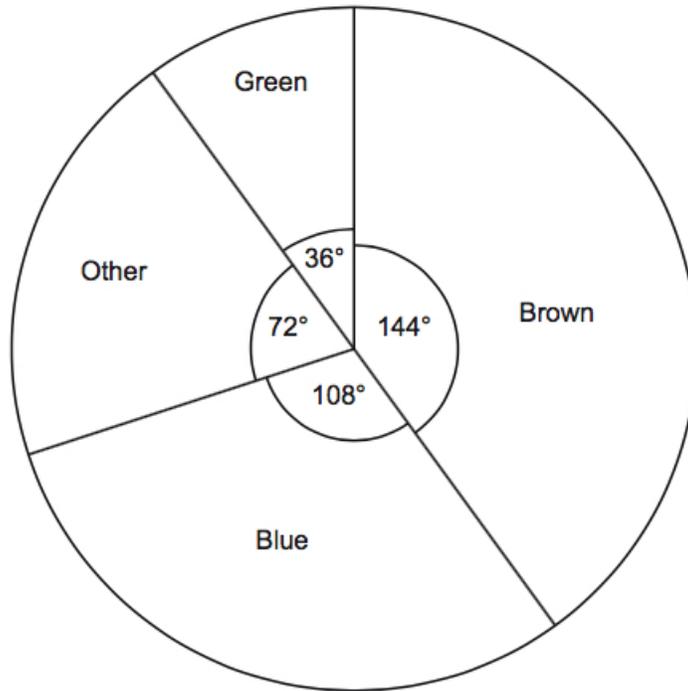
The ranger says, "There are about 8 000 fish in the lake."

Show that she is correct.

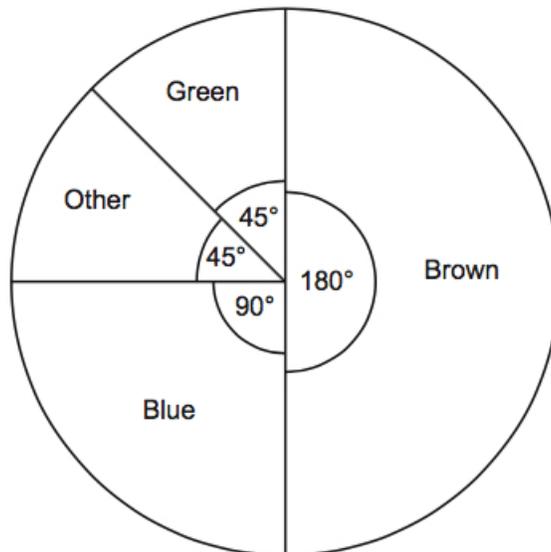
14. The pie charts show the eye colour of some students.

(5)

Girls



Boys



The areas of the pie charts are proportional to the number of students.

The radius of the girls' pie chart is 5 cm.

The radius of the boys' pie chart is 4 cm.

5 girls have green eyes.

How many boys and girls altogether have blue eyes?

15. A headteacher wants to do a survey of students in Years 9, 10, and 11. (3)

The table shows the number of students in each year.

Year	9	10	11
Number in Year	235	215	250

She wants to take a sample of 70 students, stratified by year group.

Complete the table below to show the number of students in each year she should sample.

Year	9	10	11
Number in Year	235	215	250
Sample size			

16. Work out (2)

$$64^{\frac{1}{3}}.$$

17. Show that (2)

$$(\sqrt{3} + \sqrt{75})^2 = 108.$$

18. Show that (3)

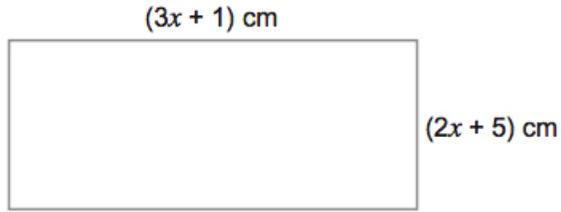
$$\frac{2}{x-3} + \frac{1}{x-1} = 1$$

simplifies to

$$x^2 - 7x + 8 = 0.$$

19. The area of this rectangle is 8 cm². (4)

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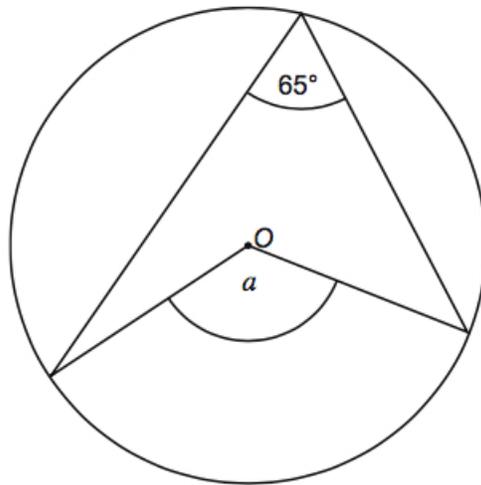


Not drawn accurately

Work out the value of x .

20. (a) O is the centre of the circle.
Work out the size of angle a .

(1)



Not drawn accurately

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Circle your answer.

115° 130° 135° 295°

- (b) Work out the size of angle b .

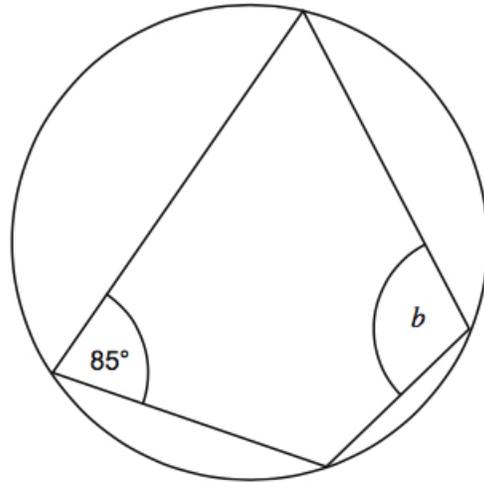
(1)

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Not drawn accurately

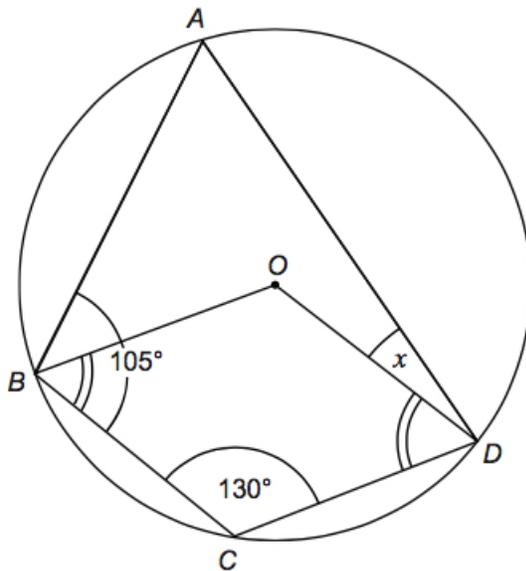
Circle your answer.

- 85° 90° 95° 115°

(c) $ABCD$ are points on the circumference of a circle centre O .

(4)

- Angle $BCD = 130^\circ$,
- Angle $ABC = 105^\circ$, and
- Angle $OBC =$ angle ODC .

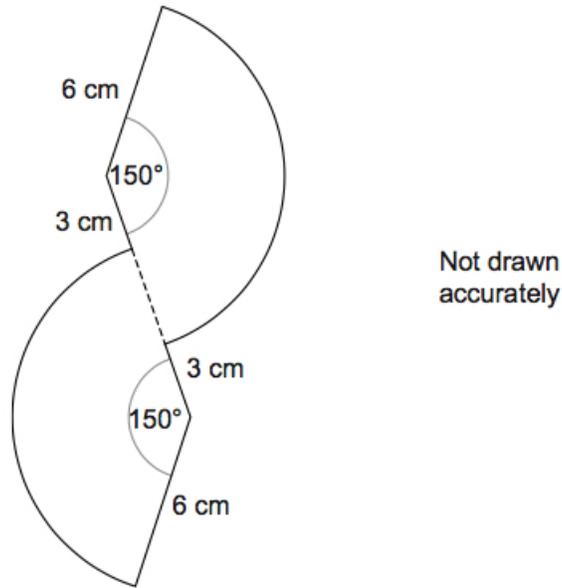


Not drawn accurately

Work out the size of angle ADO , marked x on the diagram.
You **must** show your working which may be on the diagram.

21. This shape is made from two identical sectors.

(4)



Work out the perimeter of the shape.
Give your answer in terms of π .