Dr Oliver Mathematics
AQA Mathematics
2016 June Paper 2: Calculator
1 hour 30 minutes

The total number of marks available is 105.
Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.
You must write down all the stages in your working.

1. Here are the ingredients to make 8 biscuits. (3)

75 g	flour
50 g	sugar
40 g	butter
2	egg yolks

Work out the ingredients to make 20 biscuits.

2. (a) Alice wants to book a holiday for one adult and one child. (5)

Holiday

£720 per adult

£430 per child

Special Offer
15% off

Alice has £1000

Does she have enough money to book this holiday using the special offer?
Tick a box.

Yes ☐ No ☐

You **must** show your working.

(b) Ben changes £800 to Euros before he goes on holiday. (4)
£1 = 1.25 Euro.

He spends 895 Euros.

He changes the Euros that he has left to Pounds (£).
The exchange rate is now £1 = 1.40 Euro.

How many Pounds does he get back?

3. This formula converts degrees Celsius (C) to degrees Fahrenheit (F): (3)

$$F = \frac{9}{5}C + 32.$$

Use the formula to convert 28°C to °F.
Give your answer to the nearest whole number.

4. (a) The nth term of a sequence is (2)

$$6 - 2n.$$

Work out the first three terms of the sequence.

(b) Here is the term-to-term rule for a different sequence. (3)

Multiply previous term by 2 and then subtract 3.

The third term in this sequence is 31.

Work out the **first** term.

5. The table shows information about the pay per hour of 40 people.

Pay per hour, x (£)	Frequency
$5 < x \leqslant 15$	14
$15 < x \leqslant 25$	12
$25 < x \leqslant 35$	11
$35 < x \leqslant 45$	2
$45 < x \leqslant 55$	1
	Total = 14

(a) Which group contains the median pay per hour? (1)
Circle your answer.

$5 < x \leqslant 15$ $\quad 15 < x \leqslant 25$ $\quad 25 < x \leqslant 35$ $\quad 35 < x \leqslant 45$ $\quad 45 < x \leqslant 55$

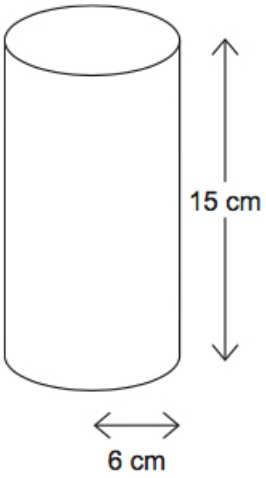
(b) Work out an estimate of the mean pay per hour. (4)

6. A baker makes 130 loaves so that there are (3)

- 6 times as many white loaves as granary loaves and
- half as many brown loaves as white loaves.

How many of each type does he make?

7. (a) The diagram shows a cylinder. (3)



- The radius of the base is 6 cm.
- The height is 15 cm.

Work out the volume.

(b) $1\,000$ cm^3 = 1 litre. (4)

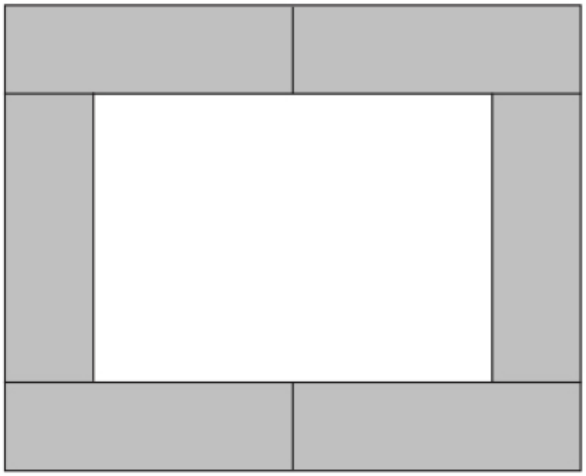
A tank contains $45\,000$ cm^3 of water.
The tank leaks at 0.75 litres/minute.

How long does the tank take to empty?

8. The diagram shows a rectangle. (5)

Not drawn accurately

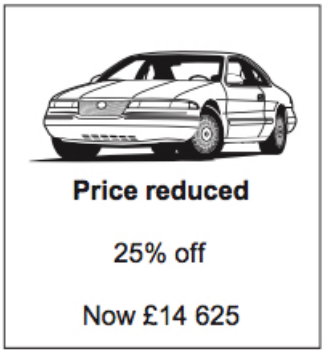
Six of these rectangles are joined to make this shape.



The area of the white rectangle in the middle is 1 440 cm^2.

Work out the area of **one** shaded rectangle.

9. Work out the price of the car before it was reduced. (3)

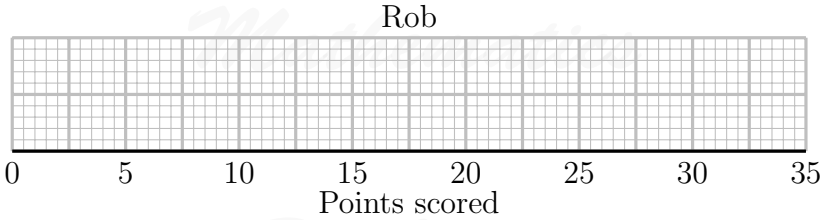


10. Rob played in 15 basketball matches.
The stem-and-leaf diagram shows the number of points he scored in each match.

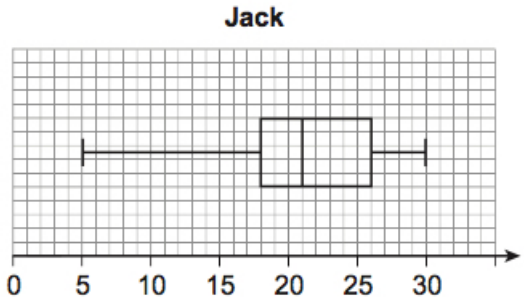
0	5						
1	2	2	4	5	6	7	8
2	2	2	3	6	6	9	
3	0						

Key: 0|5 represents 5 points.

(a) Draw a box plot to represent the data. (4)



(b) This box plot represents the points that Jack scored in 15 basketball matches. (2)



Jack says, "I am better at basketball than Rob."

Give **two** reasons that support his statement.

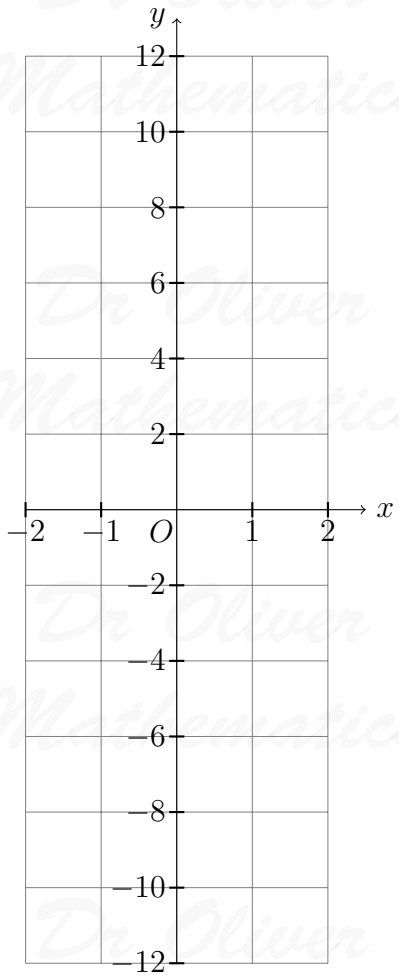
11. Here is a table of values for (2)

$$y = x^3 - 2, \text{ for } x = -2 \text{ to } 2.$$

x	-2	-1	0	1	2
y	-10	-3	-2	-1	6

Draw the graph of

$$y = x^3 - 2, \text{ for } x = -2 \text{ to } 2.$$

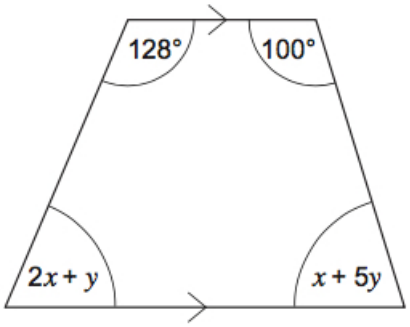


12. Two boats leave a port at the same time. (5)

- Boat A travels due West at an average speed of 20 km/h.
- Boat B travels due South at an average speed of 30 km/h.

How far apart are the boats after 2.5 hours?
Give your answer to 2 significant figures.

13. The diagram shows a trapezium. (5)



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Work out the values of x and y.

14. Write down the equation of the straight line that (2)

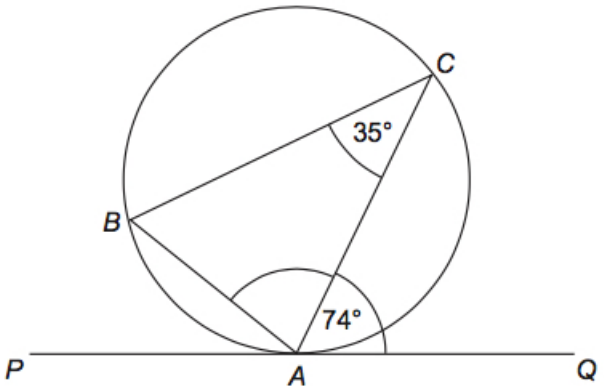
- passes through the point $(0, 4)$ **and**
- is parallel to the line $y = 5x + 3$.

15. (3)

- Bags of nails weigh 200 grams each.
- Boxes of screws weigh 140 grams each.
- Both measurements are given to the nearest 10 grams.

Show that 4 bags of nails could weigh the same as 6 boxes of screws.

16. A, B, and C are points on a circle. (2)
PAQ is a tangent to the circle.



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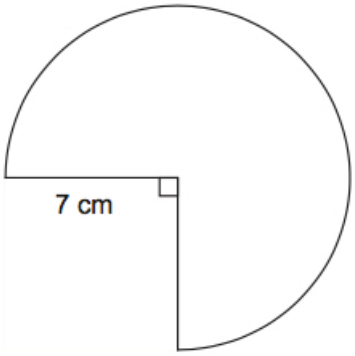
Work out the size of angle CAB.

17. The diagram shows a sector of a circle. (3)
The radius is 7 cm.



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Work out the **perimeter** of the shape.

18. The table shows information about the masses of 400 hamsters.

Mass, w (grams)	Frequency
$80 < w \leqslant 100$	100
$100 < w \leqslant 115$	150
$115 < w \leqslant 125$	90
$125 < w \leqslant 150$	60

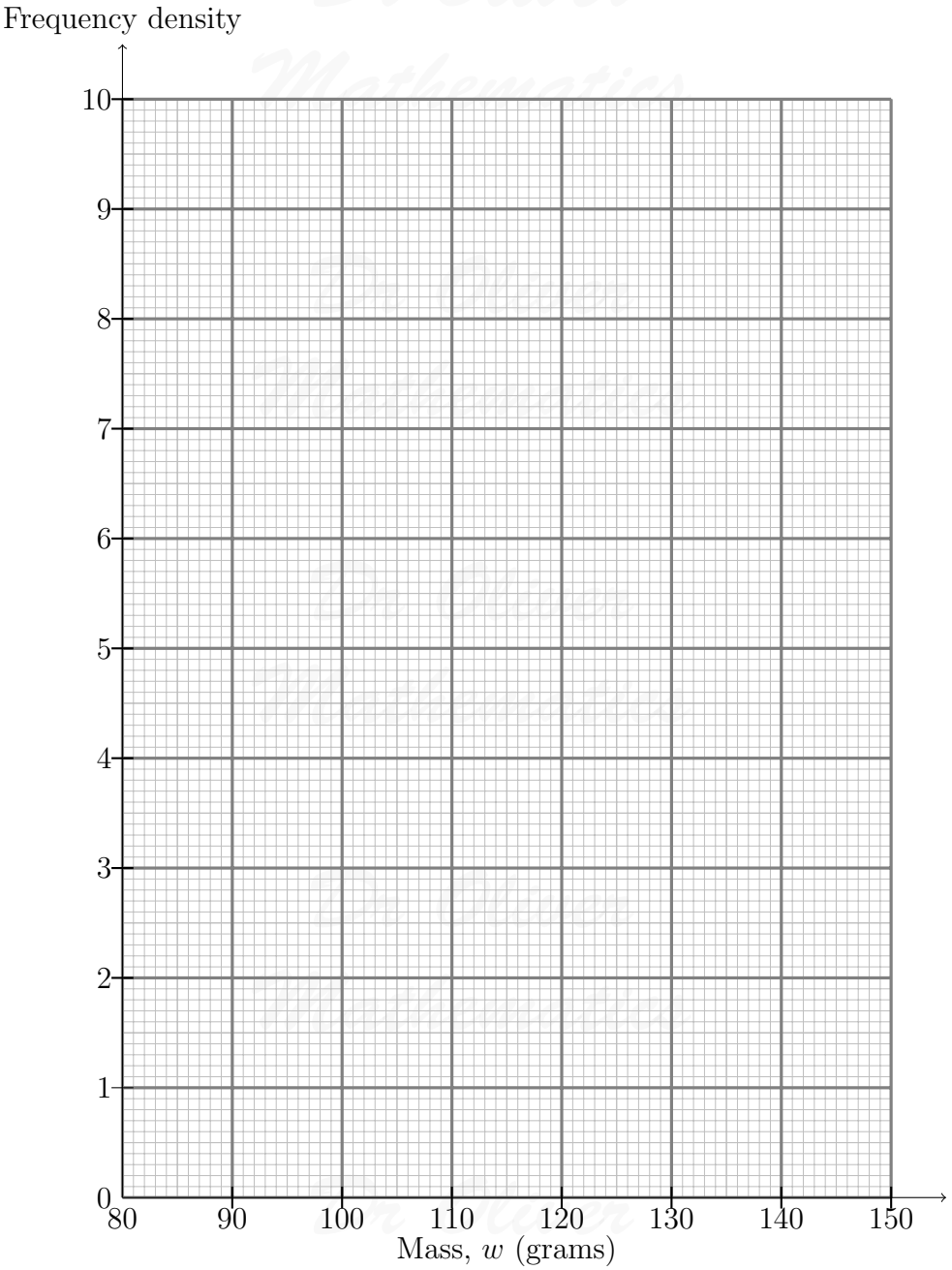
(a) A sample of size 50, stratified by the groups in the table, is to be taken. (3)

Work out the number of hamsters from each group in the sample.
Write your answers in the table below.

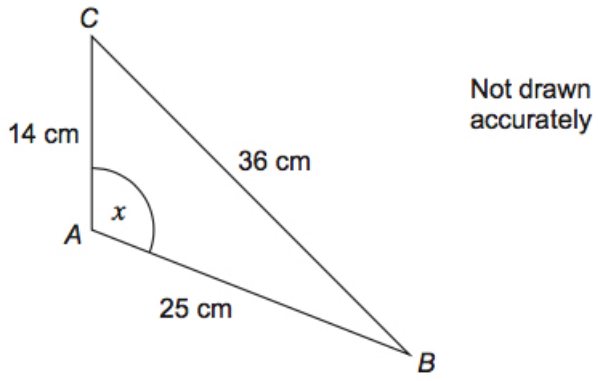
Mass, w (grams)	Number in the sample
$80 < w \leqslant 100$	
$100 < w \leqslant 115$	
$115 < w \leqslant 125$	
$125 < w \leqslant 150$	

(b) Draw a histogram for the data. (4)
You may use the table to help you.

Mass, w (grams)	Frequency
$80 < w \leqslant 100$	100
$100 < w \leqslant 115$	150
$115 < w \leqslant 125$	90
$125 < w \leqslant 150$	60



19. Work out the size of angle x. (3)



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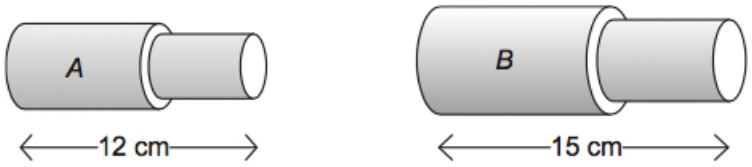
20. These two solid shapes are similar. (3)



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The volume of A is 1 400 cm^3.

Work out the volume of B.

21. A bag contains 10 counters. (3)
4 of the counters are black and 6 are white.

Two counters are picked at random.

Work out the probability that they are both black.

22. (a) Factorise (2)

$$49c^2 - d^2.$$

(b) Simplify (3)

$$\frac{x^2 - 6x}{2x^2 - 7x - 30}.$$

23. You are given that (2)

$$(x + a)^2 - 7 \equiv x^2 + 10x + b.$$

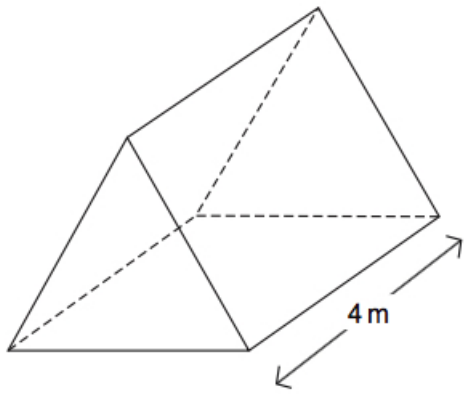
Work out the values of a and b.

24. Solve the equation (6)

$$\frac{6}{x+3} + \frac{1}{2x+3} = 3.$$

Give your answers to 2 decimal places.

25. A tent is in the shape of a triangular prism. (5)



- The length of the tent is 4 metres.
- The volume is 8 m^3.
- The cross-section of the tent is an **equilateral** triangle.

Shaun is 1.95 metres tall.

Can he stand at the highest part of the tent without having to bend over?
You **must** show your working.