

Dr Oliver Mathematics
AQA GCSE Mathematics
2013 June Paper 2: Calculator
2 hours

The total number of marks available is 105.

You must write down all the stages in your working.

1. This formula is used for working out the cost, £ C , of repairing a car:

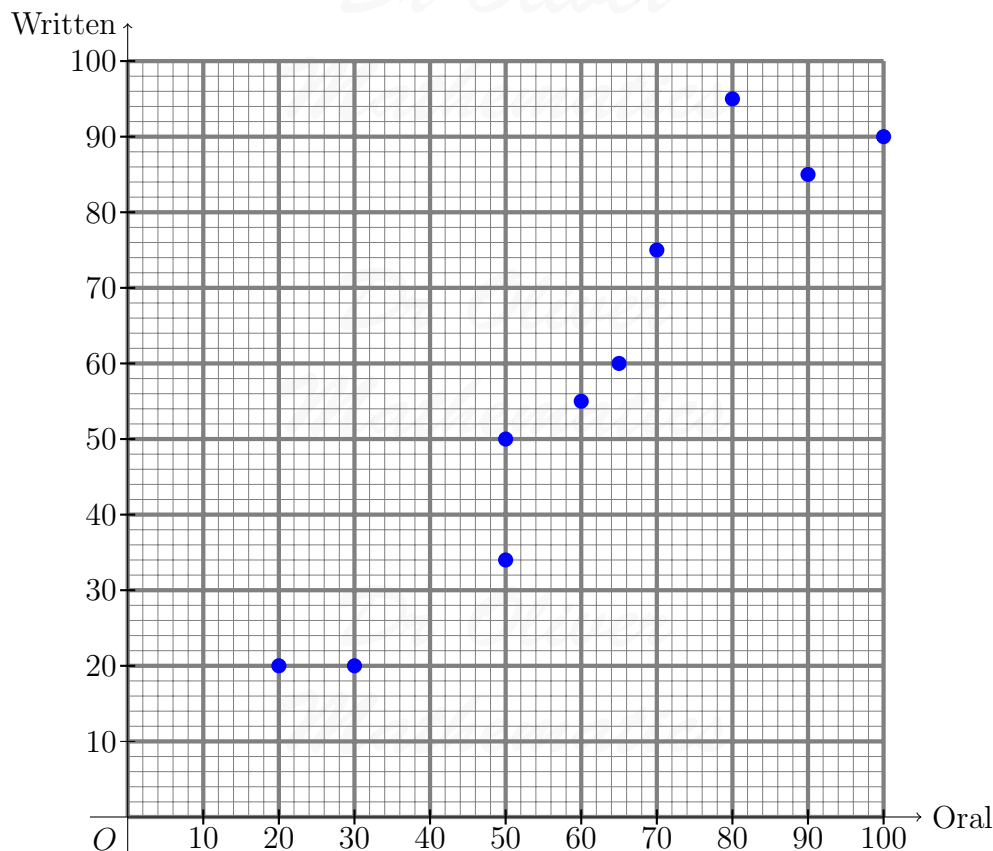
$$C = nL + 1.2P,$$

where

- n is the number of hours worked,
 - L is the labour rate (£), and
 - P is the cost of parts (£).
- (a) Work out the cost of repairing a car when $n = 3$, $L = 18$, and $P = 110$. (2)
- (b) Complete this table for another repair. (3)

C	n	L	P
£235		£22	£150

2. The scatter diagram shows the scores of 10 students in their Oral and Written tests.



- (a) How many students scored 50 in their Oral test? (1)
- (b) Four **more** students take the same tests. (2)
The table shows their scores.

Oral	10	94	52	84
Written	15	90	46	80

Plot the scores on the scatter diagram.

- (c) Draw a line of best fit on the scatter diagram. (1)
- (d) Rob scored 40 in the Oral test. (1)
He was absent for the Written test.

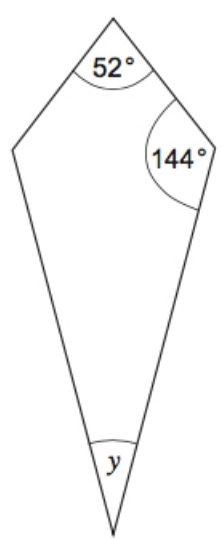
Use your line of best fit to estimate a score for him in the Written test.

3. Andrew is planning a survey about his local library.
Here is one of his questions with a response section.

How many times do you go to the library?

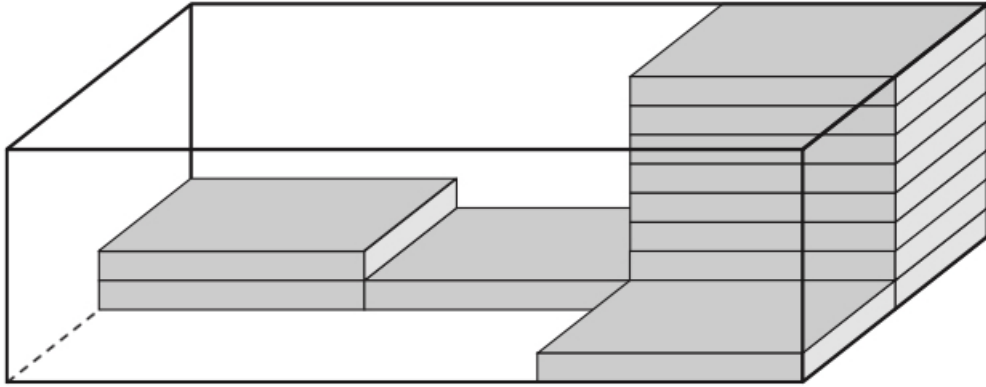
1	2	3	5 or more
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- (a) Give **one** criticism of the **question**. (1)
 - (b) Give **two** criticisms of the **response** section. (2)
4. The diagram shows a kite. (2)



Not drawn accurately

- Work out the size of angle y .
5. DVD cases are packed in this box. (5)

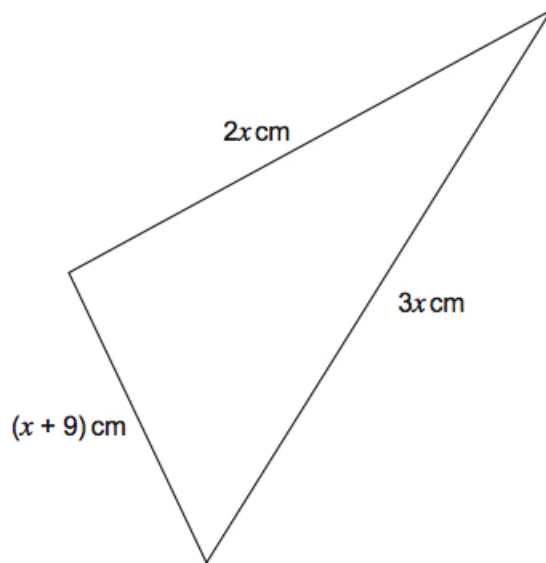


Jenny buys a **full** box of cases for £2.43
She sells all the cases for 11 pence each.
She saves **two-thirds** of the profit.

How much money does she save?

6. The perimeter of this triangle is 48 cm.

(4)



Work out the value of x .

7. Here are two ways of having a car for one year.

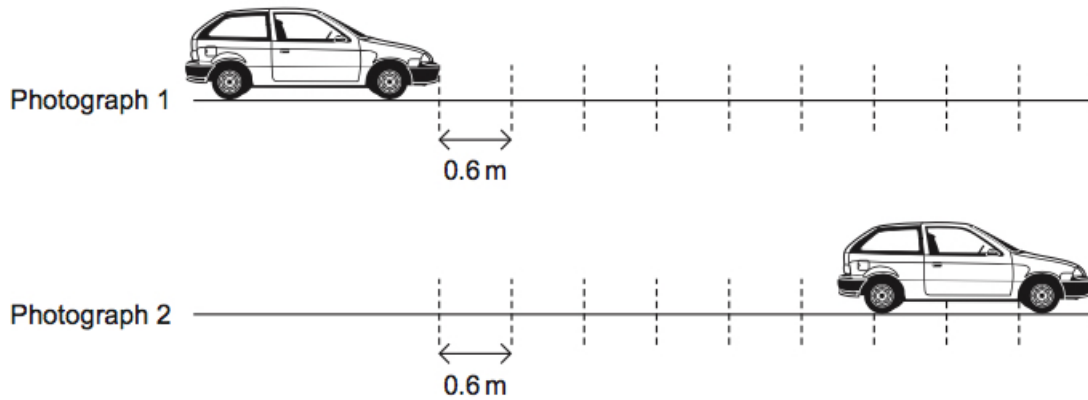
(5)

Buy and sell
Buy it for £ 12 000
Sell it for £ 10 000 after one year

Rent
Normal Price: £ 195 per month
Special Offer 15% off

Which way is cheaper?
You **must** show your working.

8. (a) A speed camera takes two photographs of a car. (3)



Photograph 2 was taken 0.5 seconds after Photograph 1.
Marks on the road are 0.6 metres apart.

Calculate the average speed of the car in m/s.

- (b) You are given that (3)

$$1 \text{ kilometre} = 1\,000 \text{ metres}$$

and

$$1 \text{ hour} = 3\,600 \text{ seconds.}$$

A lorry is travelling at 13.6 m/s.

The speed limit is 50 km/h.

Show that the lorry is travelling below the speed limit.

9. A tank contains 0.6 m^3 of water. (3)

The water is used to fill pots.

Each pot can hold $1\,250 \text{ cm}^3$ of water.

How many pots can be filled?

10. 150 boys and 160 girls sit an examination.

The table shows some of the probabilities that they came with or without a calculator.

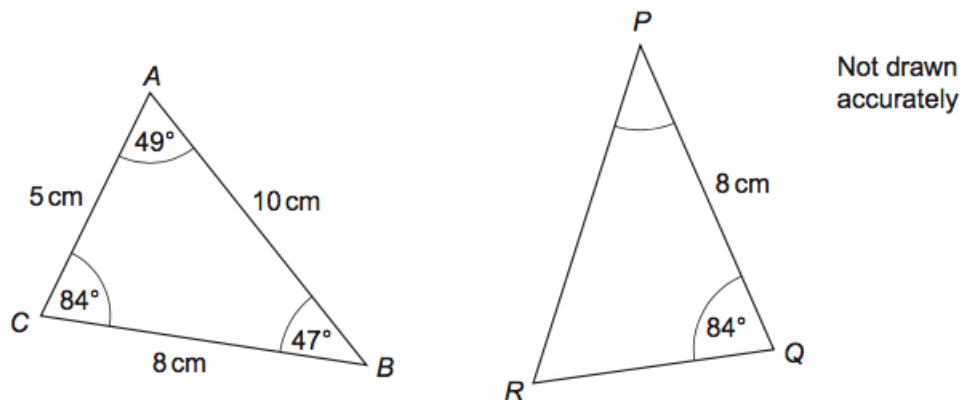
	With calculator	Without calculator
Boy	0.92	0.08
Girl	0.95	

- (a) What is the probability that a girl came **without** a calculator? (1)

Write your answer in the table.

- (b) How many of the 150 boys came **with** a calculator? (2)

11. These two triangles are congruent.



- (a) What is the size of angle P ? (1)

Circle your answer.

47° 49° 84° none of these

- (b) What is the length of PR ? (1)

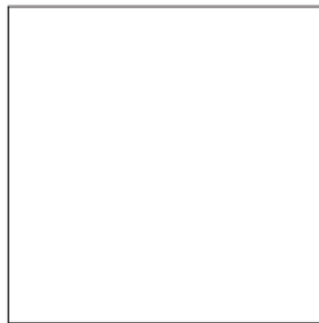
Circle your answer.

5 cm 8 cm 10 cm none of these

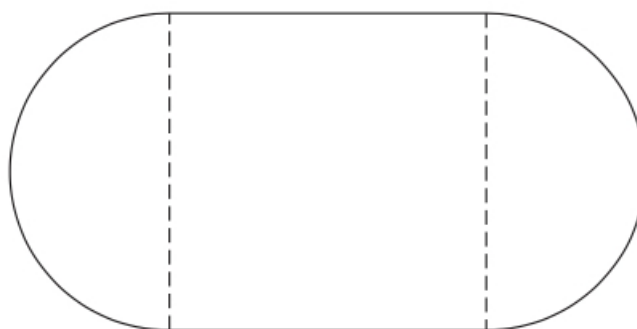
12. The perimeter of this square is 48 cm. (4)

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Semi-circles are joined to two sides of the square.



Work out the perimeter of this shape.

13. Amy raised $\pounds n$ for charity. (5)
Chris raised $\pounds 18$ more than Amy.

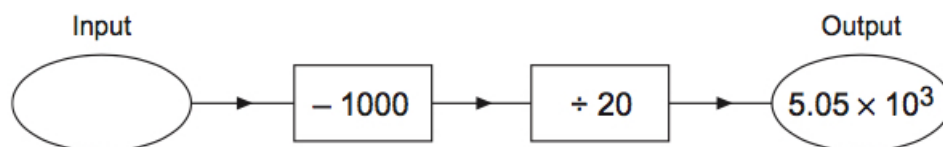
The mean amount raised by the two of them is $\pounds 45$.

Work out how much money each one of them raised.

14. (a) Work out (2)
 $(6.45 \times 10^6) \times (2.5 \times 10^{-4})$.

Write your answer in standard form.

- (b) Here is a number machine. (3)



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Work out the input when the output is 5.05×10^3 .

Write your answer in standard form.

15. (a) Work out the value of (1)

$$x^3 - 2x + 7$$

when $x = -2.5$.

- (b) Factorise fully (2)

$$4x^2 + 6xy.$$

16. Here is part of a shopping bill for clothing. (5)

1 jacket at
1 shirt at £29
Total cost before discount =
10% discount
Total to pay after discount = £80.10

Work out the cost of the jacket **before** the discount.

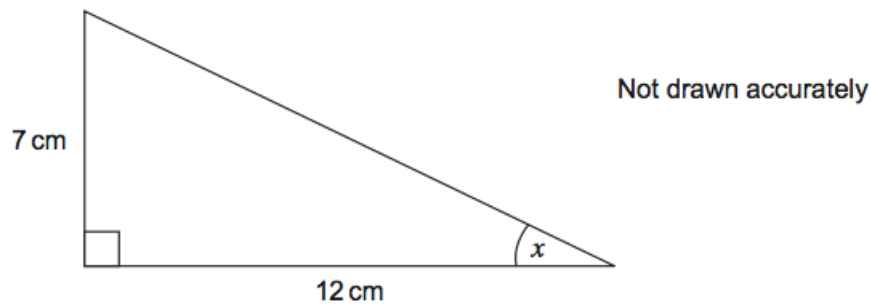
17. A is the point with coordinates $(x, 2y)$. (4)

B is the point with coordinates $(3x, 4y)$.

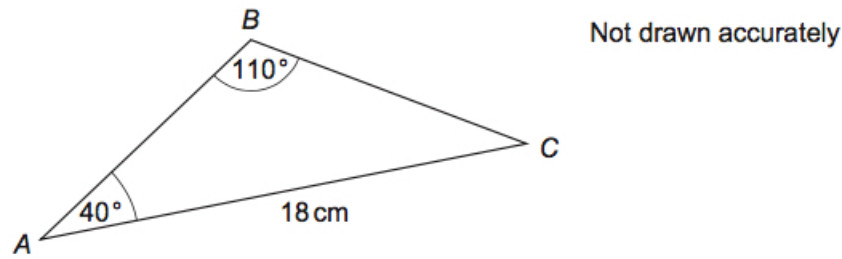
The midpoint of AB has coordinates $(-4, 15)$.

Work out the values of x and y .

18. (a) Work out the size of angle x . (3)



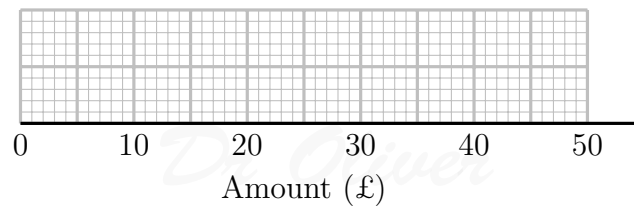
- (b) Work out the length BC . (3)



19. (a) The table shows information about the travel expenses of employees at a company. All amounts are in £. (2)

Minimum	Lower Quartile	Median	Upper Quartile	Maximum
9	18	23	30	45

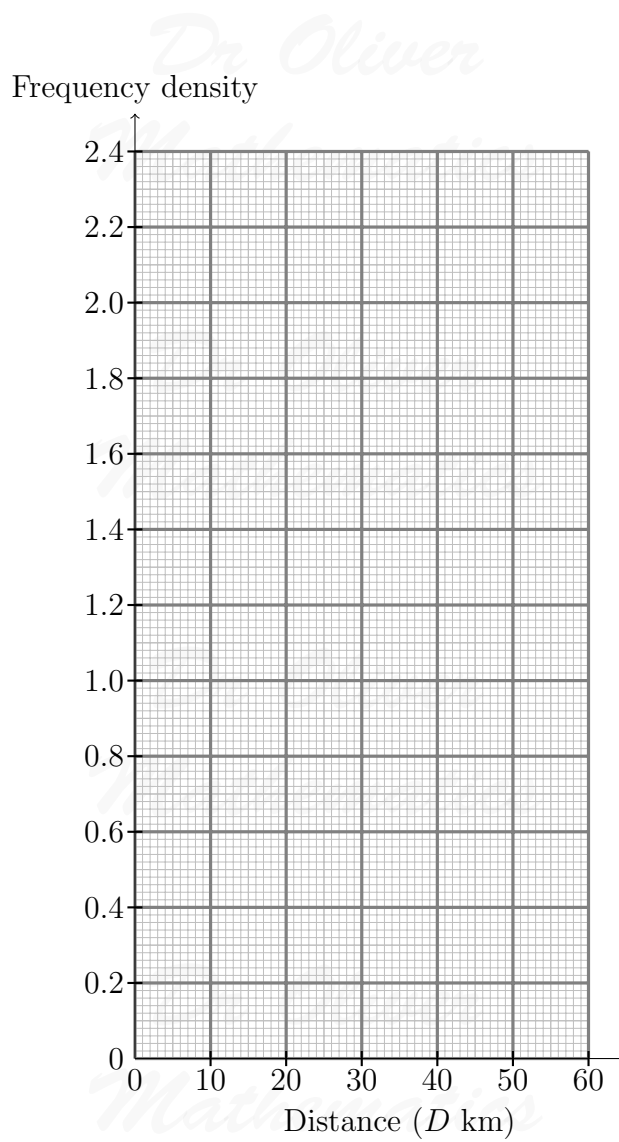
Draw a box plot to show this information.



- (b) This table shows information about the distances the employees travel to work. (3)

Distance, D km	Frequency
$0 < D \leq 10$	17
$10 < D \leq 15$	12
$15 < D \leq 30$	3
$30 < D \leq 60$	9

Draw a histogram to show this information.



20. Solve the equation (3)

$$2x^2 + 8x + 5 = 0.$$

Give your answers to 2 decimal places.

21. The expression (3)

$$\frac{x^2 - 9}{x^2 + bx - 15}$$

simplifies to

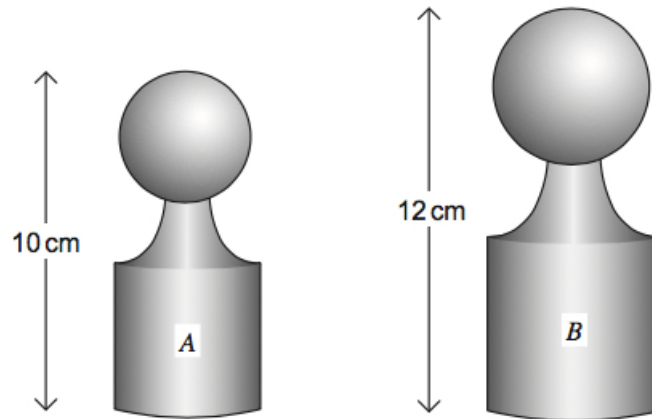
$$\frac{x + 3}{x + 5}.$$

Work out the value of b .

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22. A and B are two similar solids.

(3)



The volume of A is 500 cm^3 .

Work out the volume of B .

23. A bag contains 12 counters.

(3)

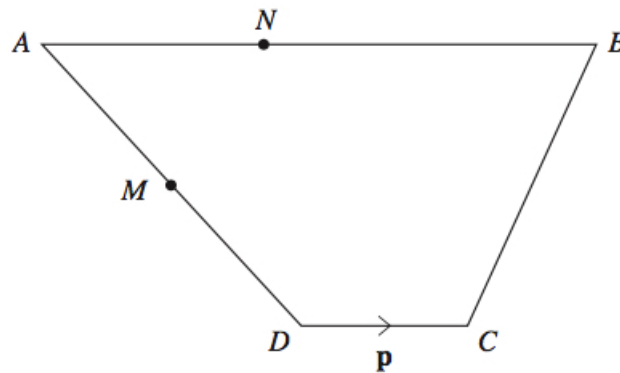
Five of the counters are white.

A counter is taken out of the bag at random and **not** replaced.

A second counter is taken out of the bag at random.

Calculate the probability that **only one** of the two counters is white.

24. AB is parallel to DC .



Not drawn accurately

$$\vec{AB} = 5\mathbf{p}.$$

$$\vec{DC} = \mathbf{p}.$$

$$\vec{DA} = 2\mathbf{q} - \mathbf{p}.$$

(a) Show that (1)

$$\overrightarrow{CB} = 2\mathbf{q} + 3\mathbf{p}.$$

(b) M is the midpoint of AD . (4)

$$\overrightarrow{AN} : \overrightarrow{NB} = 2 : 3.$$

Show that MN is parallel to CB .

25. (a) On this grid, draw the graph of (1)

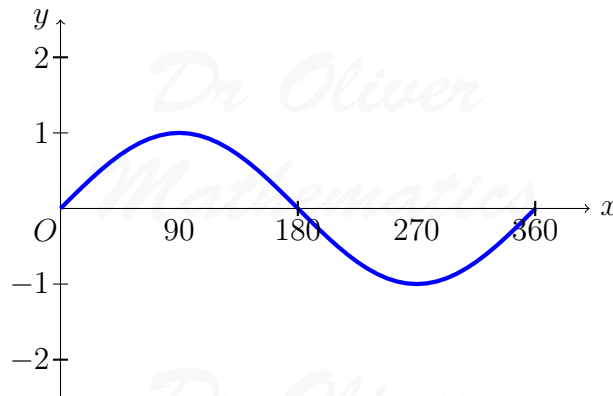
$$y = 1 + \sin x$$

for values of x from 0° to 360° .

The graph of

$$y = \sin x$$

has been drawn to help you.



(b) On this grid, draw the graph of (1)

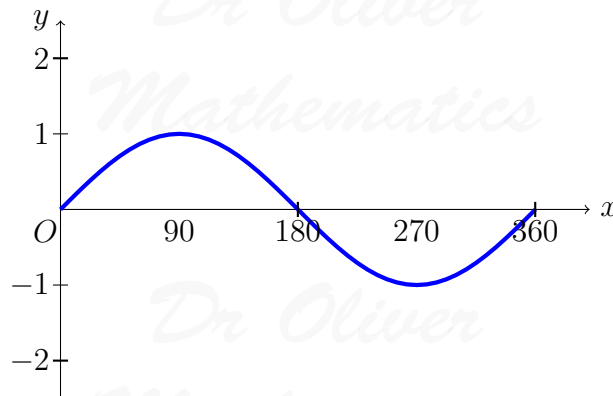
$$y = 2 \sin x$$

for values of x from 0° to 360° .

The graph of

$$y = \sin x$$

has been drawn to help you.



26. Solve the equation

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$$\frac{5}{x+2} + \frac{4}{x+1} = 2.$$

(6)

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