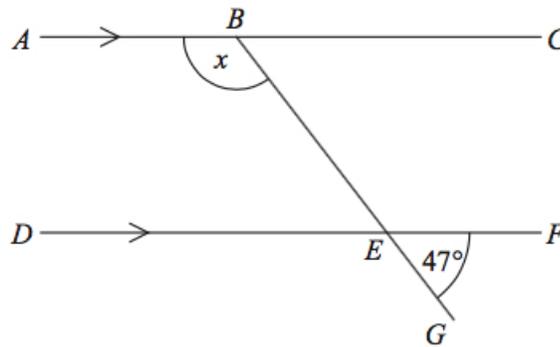


Dr Oliver Mathematics
GCSE Mathematics
2012 June Paper 2H: Calculator
1 hour 45 minutes

The total number of marks available is 100.
You must write down all the stages in your working.

1. ABC and DEF are parallel lines. (3)



BEG is a straight line.

Angle $GEF = 47^\circ$.

Work out the size of the angle marked x .

Give reasons for your answer.

2. (a) Use your calculator to work out (2)

$$\frac{38.5 \times 14.2}{18.4 - 5.9}$$

Write down all the figures on your calculator display.

You must give your answer as a decimal.

- (b) Write your answer to part (a) correct to 1 significant figure. (1)
3. Pradeep wants to find out how much time people spend playing sport.
He uses this question on a questionnaire.

How much time do you spend playing sport?

0 – 1 hours

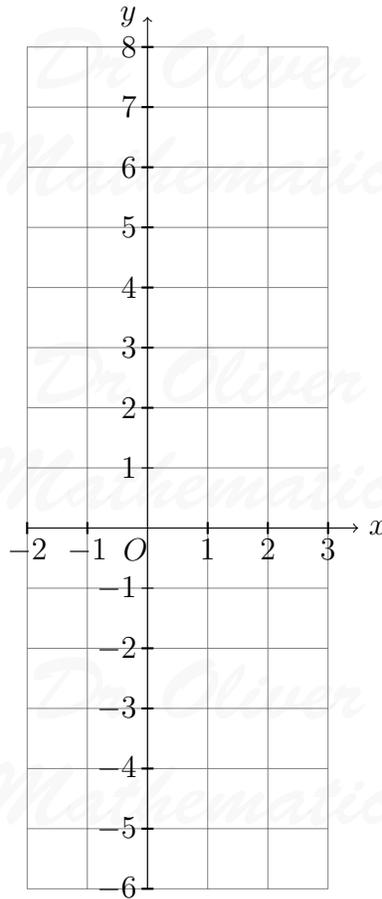
1 – 2 hours

3 – 4 hours

(a) Write down **two** things wrong with this question. (2)

(b) Design a better question for Pradeep's questionnaire to find out how much time people spend playing sport. (2)

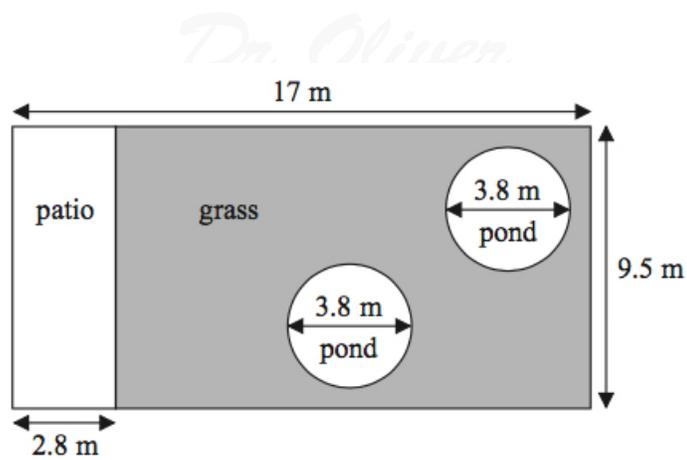
4. On the grid, draw the graph of $y = 3x - 2$ for values of x from -1 to 3 . (3)



5. Mr Weaver's garden is in the shape of a rectangle. (5)

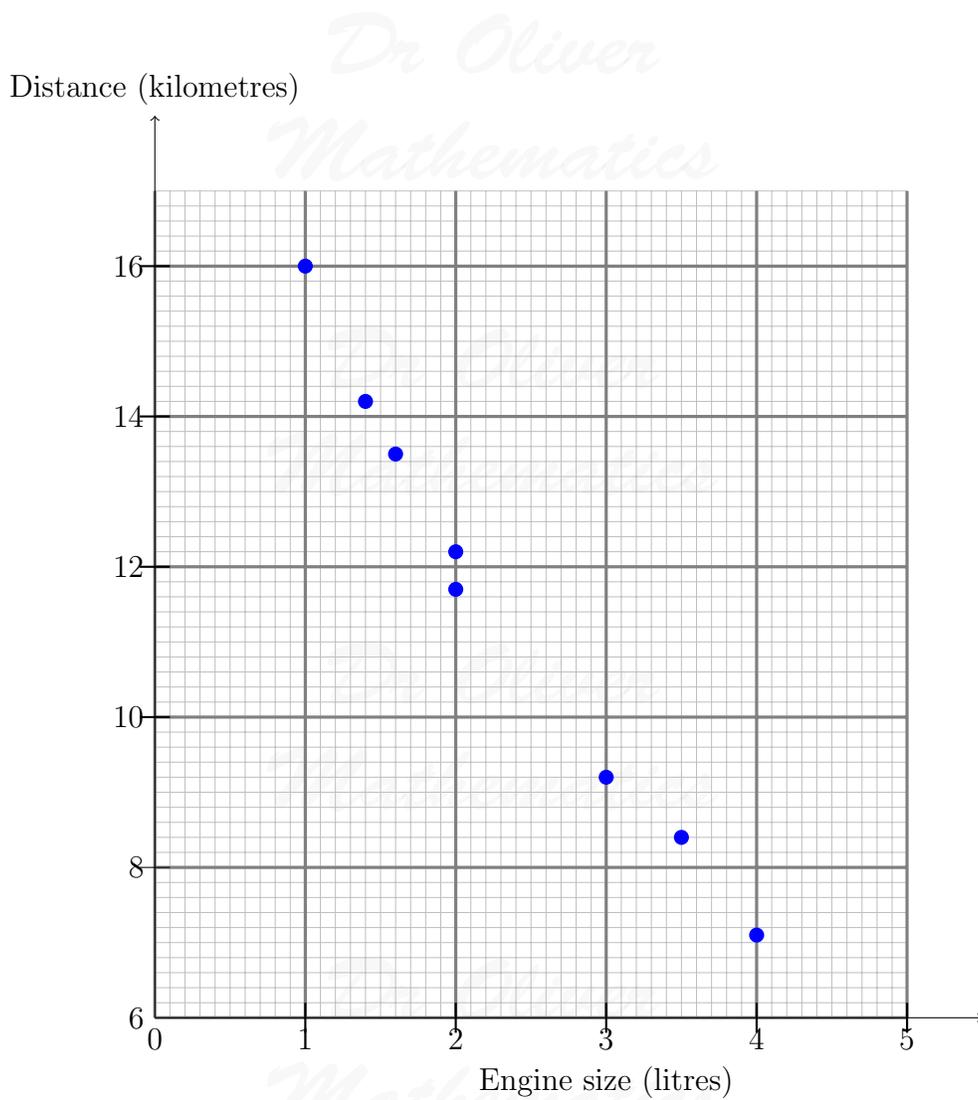
In the garden there is a patio in the shape of a rectangle and two ponds in the shape of circles with diameter 3.8 m.

The rest of the garden is grass.



Mr Weaver is going to spread fertiliser over all the grass.
 One box of fertiliser will cover 25 m^2 of grass.
 How many boxes of fertiliser does Mr Weaver need?
 You must show your working.

6. Potatoes cost £9 for a 12.5 kg bag at a farm shop. (4)
 The same type of potatoes cost £1.83 for a 2.5 kg bag at a supermarket.
 Where are the potatoes the better value, at the farm shop or at the supermarket?
 You must show your working.
7. The scatter graph shows some information about 8 cars.
 For each car it shows the engine size, in litres, and the distance, in kilometres, the car
 travels on one litre of petrol.

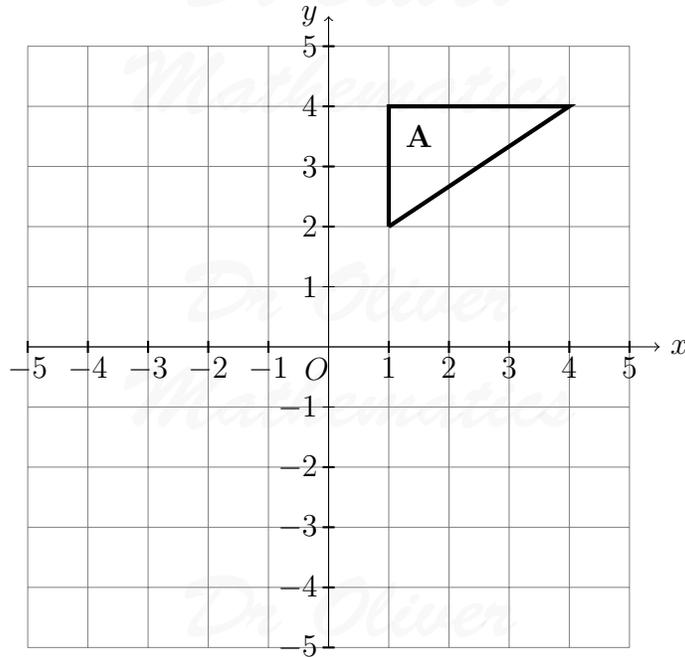


(a) What type of correlation does the scatter graph show? (1)

A different car of the same type has an engine size of 2.5 litres.

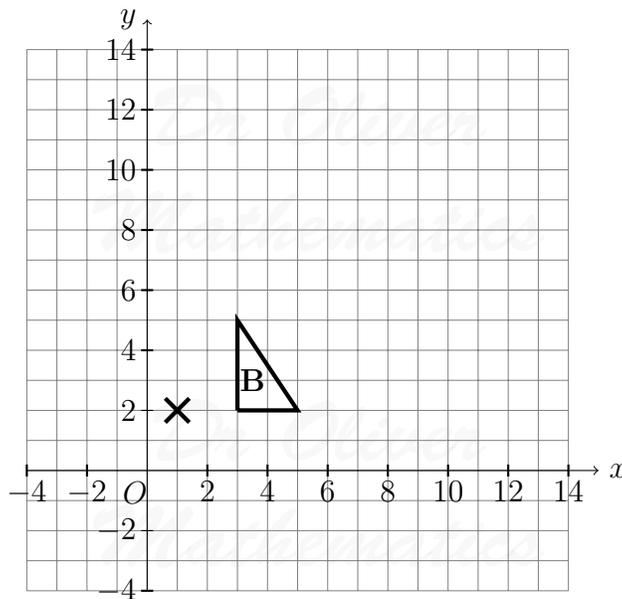
(b) Estimate the distance travelled on one litre of petrol by this car. (2)

8. (a) Rotate triangle **A** 90° clockwise, centre *O*. (2)



(b) Enlarge triangle **B** by scale factor 3, centre (1, 2).

(3)



9. Linda is going on holiday to the Czech Republic.
 She needs to change some money into koruna.
 She can only change her money into 100 koruna notes.
 Linda only wants to change up to £200 into koruna.

(3)

She wants as many 100 koruna notes as possible.
 The exchange rate is £1=25.82 koruna.
 How many 100 koruna notes should she get?

10. m is an integer such that $-2 < m \leq 3$.
 (a) Write down all the possible values of m . (2)

(b) Solve (2)

$$7x - 9 < 3x + 4.$$

11. The equation (4)

$$x^3 - 6x = 72$$

has a solution between 4 and 5.
 Use a trial and improvement method to find this solution.
 Give your answer correct to one decimal place.
 You must show **all** your working.

12. The probability that a biased dice will land on a five is 0.3. (2)

Megan is going to roll the dice 400 times.
 Work out an estimate for the number of times the dice will land on a five.

13. Bob asked each of 40 friends how many minutes they took to get to work. (4)

The table shows some information about his results.

Time taken (m minutes)	Frequency
$0 < m \leq 10$	3
$10 < m \leq 20$	8
$20 < m \leq 30$	11
$30 < m \leq 40$	9
$40 < m \leq 50$	9

Work out an estimate for the mean time taken.

14. (a) Expand and simplify (2)

$$(p + 9)(p - 4).$$

- (b) Solve (3)

$$\frac{5w - 8}{3} = 4w + 2.$$

- (c) Factorise (1)

$$x^2 - 49.$$

(d) Simplify

$$(9x^8y^3)^{\frac{1}{2}}$$

(2)

15. Henry is thinking about having a water meter.

(5)

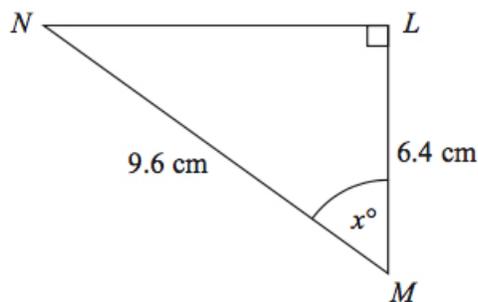
These are the two ways he can pay for the water he uses.

Water Meter	No Water Meter
A charge of £28.20 per year	A charge of £107 per year
plus	
91.22p for every cubic metre of water used	
1 cubic metre = 1000 litres	

Henry uses an average of 180 litres of water each day.
Henry wants to pay as little as possible for the water he uses.
Should Henry have a water meter?

16. LMN is a right-angled triangle.

(3)



$$MN = 9.6 \text{ cm.}$$

$$LM = 6.4 \text{ cm.}$$

Calculate the size of the angle marked x° .

Give your answer correct to 1 decimal place.

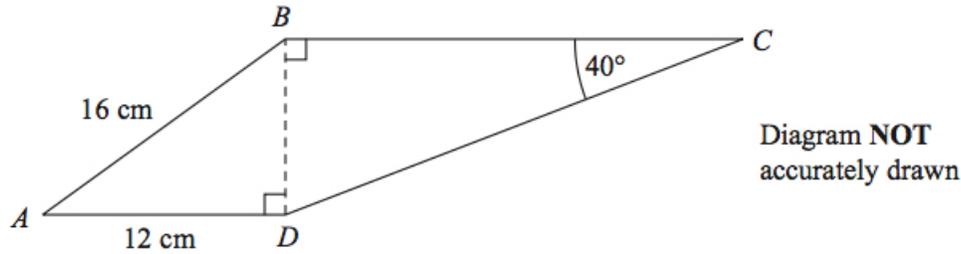
17. Liam invests £6 200 for 3 years in a savings account.

(3)

He gets 2.5% per annum compound interest.

How much money will Liam have in his savings account at the end of 3 years?

18. The diagram shows a quadrilateral $ABCD$. (5)



$AB = 16$ cm.
 $AD = 12$ cm.
Angle $BCD = 40^\circ$.
Angle $ADB = \text{angle } CBD = 90^\circ$.
Calculate the length of CD .
Give your answer correct to 3 significant figures.

19. (3)

$$p^2 = \frac{x - y}{xy}.$$

$$x = 8.5 \times 10^9.$$

$$y = 4 \times 10^8.$$

Find the value of p .

Give your answer in standard form correct to 2 significant figures.

20. Make t the subject of the formula (3)

$$2(d - t) = 4t + 7.$$

21. Prove that (3)

$$(2n + 3)^2 - (2n - 3)^2$$

is a multiple of 8 for all positive integer values of n .

22. Solve (3)

$$3x^2 - 4x - 2 = 0.$$

Give your solutions correct to 3 significant figures.

23. (a) Max wants to take a random sample of students from his year group. (2)

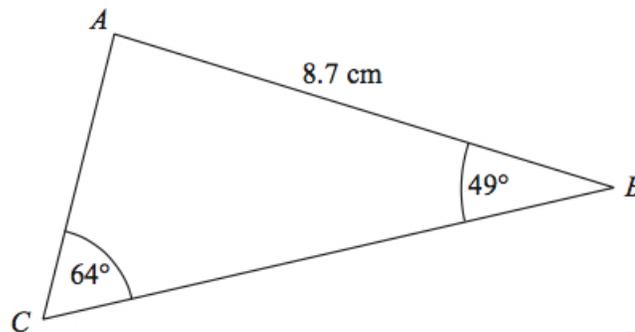
- Explain what is meant by a random sample.
- Describe a method Max could use to take his random sample.

- (b) The table below shows the numbers of students in 5 year groups at a school. (2)

Year	Number of students
9	239
10	257
11	248
12	190
13	206

Lisa takes a stratified sample of 100 students by year group.
Work out the number of students from Year 9 she has in her sample.

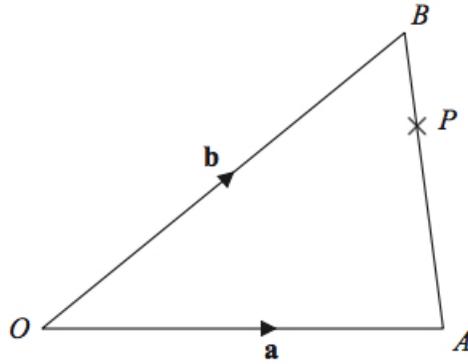
24. ABC is a triangle. (5)



$AB = 8.7$ cm.
Angle $ABC = 49^\circ$.
Angle $ACB = 64^\circ$.
Calculate the area of triangle ABC .
Give your answer correct to 3 significant figures.

25. Carolyn has 20 biscuits in a tin. (4)
She has 12 plain biscuits, 5 chocolate biscuits, and 3 ginger biscuits.
Carolyn takes at random two biscuits from the tin.
Work out the probability that the two biscuits were **not** the same type.

26. OAB is a triangle.



$$\overrightarrow{OA} = \mathbf{a}.$$

$$\overrightarrow{OB} = \mathbf{b}.$$

(a) Find \overrightarrow{AB} in terms of \mathbf{a} and \mathbf{b} .

(1)

P is the point on AB such that $AP : PB = 3 : 1$.

(b) Find \overrightarrow{OP} in terms of \mathbf{a} and \mathbf{b} .

(3)

Give your answer in its simplest form.