

Subject: Mathematics

Course: Pearson Edexcel A-Level Mathematics

Lead teacher: Mrs Azad & Mrs Jones

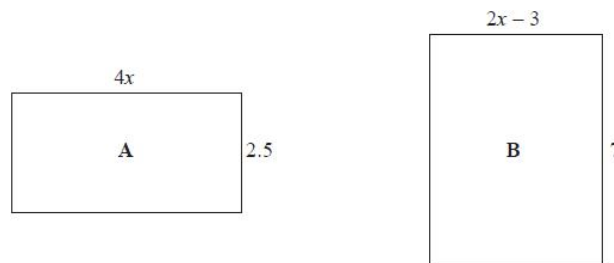
People to follow on social media: @DrfrostMaths @mr_man_maths

@Integral_Maths @TeachieTeacherUK

Strand of Maths	Something to practice:	Something to watch/listen (Sparx maths video codes)
Pure: Mathematics	Algebraic expressions & equations (index laws, expanding polynomials, surds)	Indices: U299, U772, U985 Brackets: U606, U858 Rearranging formulae: U191 Surds: U281, U338, U499, U633, U872,
	Quadratic Equations, completing the square, functions, sketching and transforming graphs (linear, quadratic & cubic)	Quadratic equations: U 960, U150, U665 Completing the square: U397, U589, U769 Functions: W895, U448, U996 Graphs (transformations): U598, U487, U455
	Solving simultaneous equations (graphically, linear and quadratic)	Simultaneous Equations: U547, U875, U269 Inequalities: U747, U133
	Solving inequalities (graphically/regions, linear and quadratic)	Solving inequalities: U738, U145, U337 Quadratic inequalities: U133 Regions: U747
	Straight line graphs $\rightarrow y = mx + c$	$y = mx + c$: U315, U669, U848, U377 Parallel and perpendicular lines: U898
	Equations of circles	Circles & tangents: U567
Applied: Mechanics	Converting units of measurement (SI units)	Converting units: U338, U248, U468, U663
	Vectors (Pythagoras & trigonometry)	Pythagoras: U385, U828 Trigonometry: U319, U283, U545, U627, U967, U164
	Distance time graphs	Compound Measures: U151 DT Graphs: U966, U462, U914, U403
	Velocity time graphs	VT Graphs: U937, U562, U611
Applied: Statistics	Measures of location and spread (mean, median, mode & range $\rightarrow$ discrete and continuous)	Non-grouped data: U569 Grouped data: U312
	Box-plots, cumulative frequency & histograms	Box plots: U879, U837 CF graphs: U182, U507 Histograms: U185, U814, U983, U297
	Bi-variate data & correlation (Scatter graphs)	Scatter graphs: U199, U277, U128
	Venn Diagrams & Probability	Venn diagrams: U699 Probability: U369, U821, U246, U806

Pure: Mathematics Practice Questions**Q1.**(a) Factorise fully $6ab + 10ac$ (b) Expand and simplify $(x - 5)(x + 7)$ (c) Simplify $\frac{2m^2t^6}{m^4t^2}$ (d) Factorise $y^2 - 16$ (e) Simplify $(h^2)^{-3}$ **Q2.**

Here are two rectangles.



All measurements are in centimetres.

The area of rectangle **A** is equal to the area of rectangle **B**.Work out the perimeter of rectangle **B**.**Q3.** Write as sums of powers of x .

a $\frac{x^5 + 1}{x^2}$

b $x^2 \left(x + \frac{1}{x} \right)$

c $x^{-4} \left(x^2 + \frac{1}{x^3} \right)$

Q4.

Show that

$$(3x - 1)(x + 5)(4x - 3) = 12x^3 + 47x^2 - 62x + 15$$

for all values of x .**Q5.**

Prove algebraically that

 $(2n + 1)^2 - (2n + 1)$ is an even number for all positive integer values of n .

Q6.Make t the subject of the formula

$$p = \frac{3 - 2t}{4 + t}$$

Q7.Solve $3x^2 - x - 1 = 0$

Give your solutions correct to 2 decimal places.

Q8.Solve, by factorising, the equation $8x^2 - 30x - 27 = 0$ **Q9.**

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

Give your solutions as surds.

Q10.The equation of a curve is $y = 4x^2 - 56x$ The curve has one turning point.By completing the square, show that the coordinates of the turning point are $(7, -196)$

You must show all your working.

Q11.

Solve the simultaneous equations

$$\begin{aligned} 4x + 2y &= 7 \\ 3x - 5y &= -24 \end{aligned}$$

Q12.

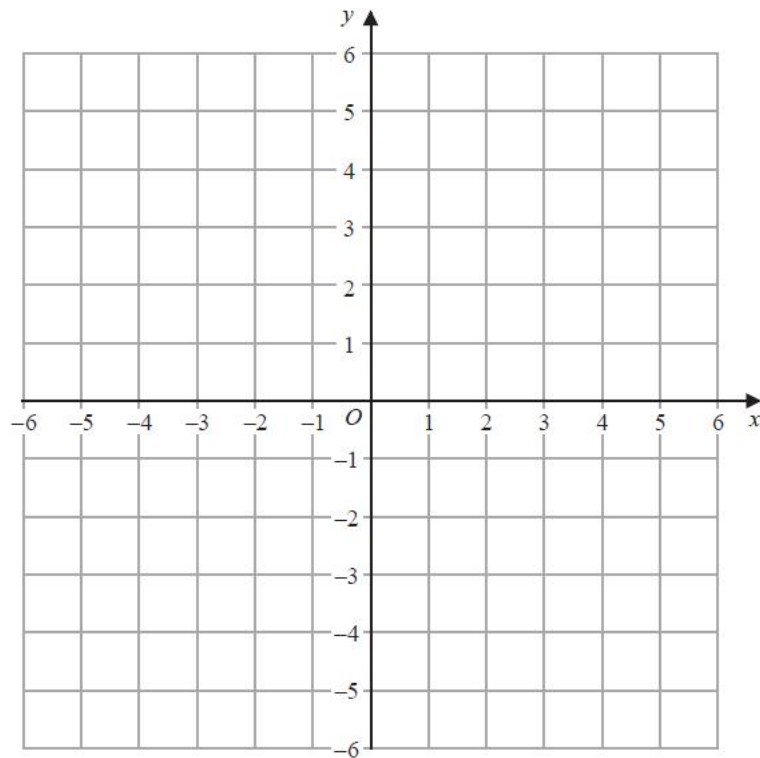
Solve algebraically the simultaneous equations

$$\begin{aligned} 2x^2 - y^2 &= 17 \\ x + 2y &= 1 \end{aligned}$$

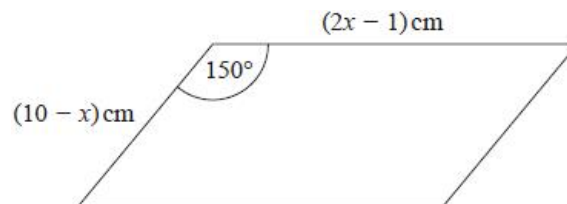
Q13.Solve $6x + 4 > x + 17$ **Q14.**

On the grid show, by shading, the region that satisfies all of these inequalities.

$$2y + 4 < x \quad x < 3 \quad y < 6 - 3x$$

Label the region **R**.**Q15.**

The diagram shows a parallelogram.

The area of the parallelogram is greater than 15 cm^2 (a) Show that $2x^2 - 21x + 40 < 0$ (b) Find the range of possible values of x .

Q16.

- (a) Write down the equation of a straight line that is parallel to $y = 5x + 6$
- (b) Find an equation of the line that is perpendicular to the line $y = 5x + 6$ and passes through the point $(-2, 5)$.

Q17.

A circle has equation $x^2 + y^2 = 25$

The point P with coordinates $(-3, 4)$ lies on the circle.

Alex says that the tangent to the circle at P crosses the x -axis at the point $(-8, 0)$

Is Alex correct?

You must show how you get your answer.

Applied: Mechanics Practice Questions**Q1.**

Write 37 cm^3 in mm^3

Q2.

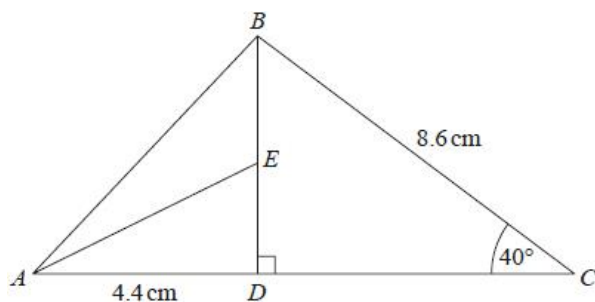
A standard bin holds 240 litres of rubbish.

A refuse lorry can hold 26 m^3 of waste.

How many full bins could be emptied into the lorry before it is full?

Q3.

The diagram shows triangle ABC .



ADC and DEB are straight lines.

$AD = 4.4 \text{ cm}$

$BC = 8.6 \text{ cm}$

E is the midpoint of DB .

Angle $CDB = 90^\circ$

Angle $DCB = 40^\circ$

Work out the size of angle EAD .

Give your answer correct to 1 decimal place.

You must show all your working.

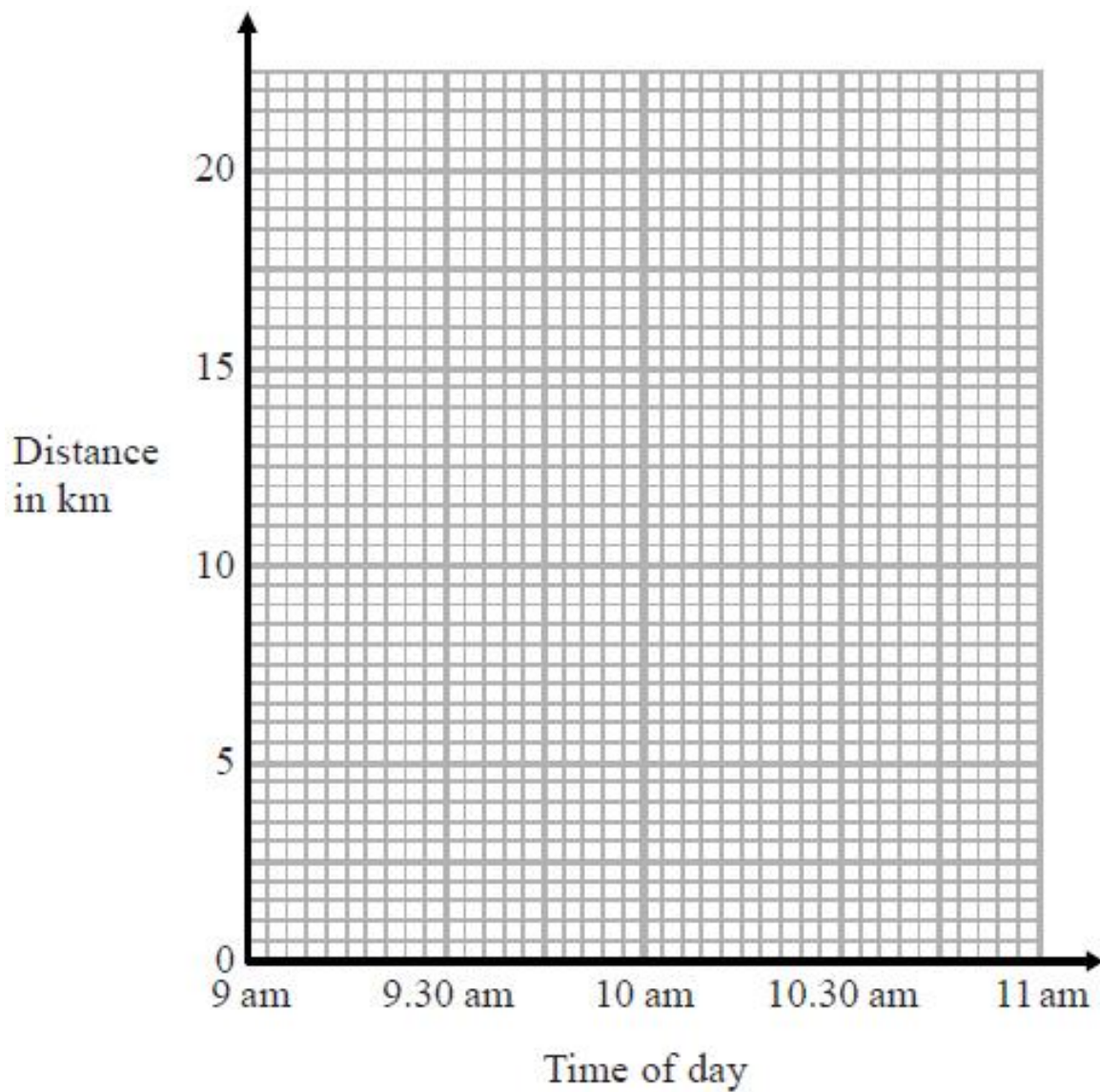
Q4.

At 9 am, Bradley began a journey on his bicycle.

From 9 am to 9.36 am, he cycled at an average speed of 15 km/h.

From 9.36 am to 10.45 am, he cycled a further 8 km.

(a) Draw a travel graph to show Bradley's journey.

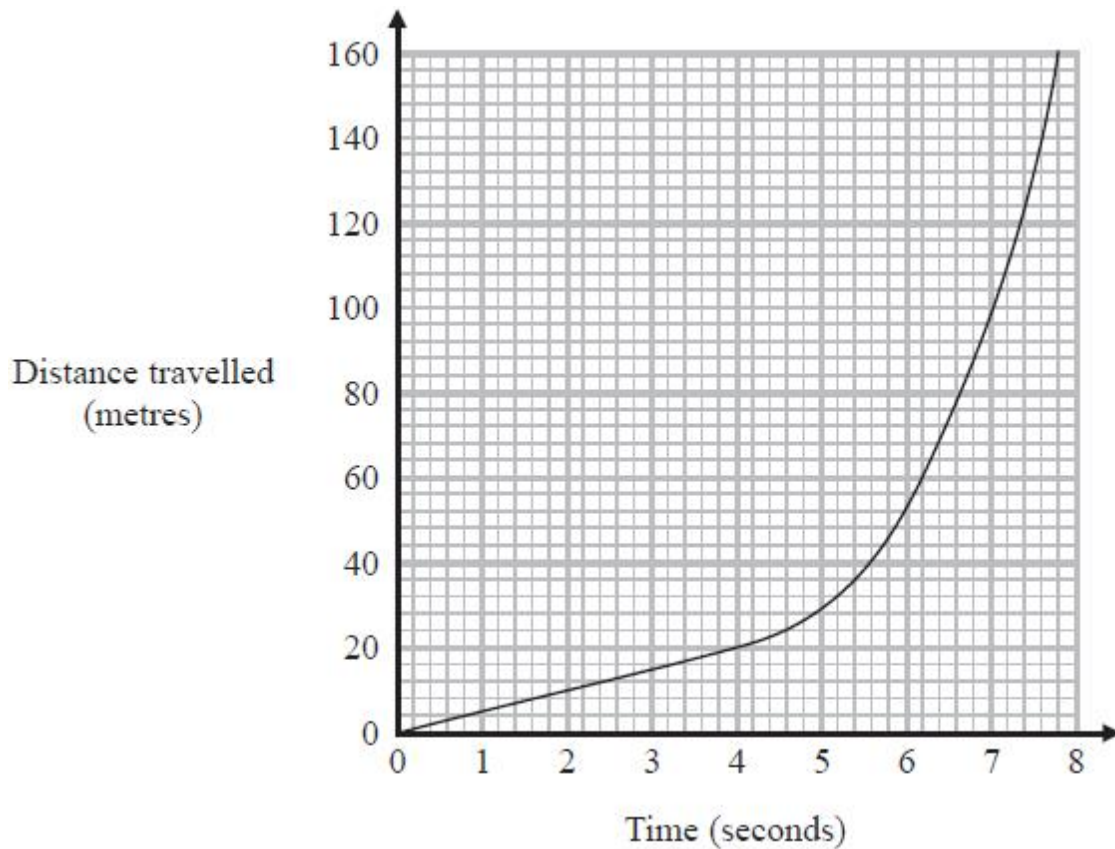


From 10.45 am to 11 am, Bradley cycled at an average speed of 18 km/h.

(b) Work out the distance Bradley cycled from 10.45 am to 11 am.

Q5.

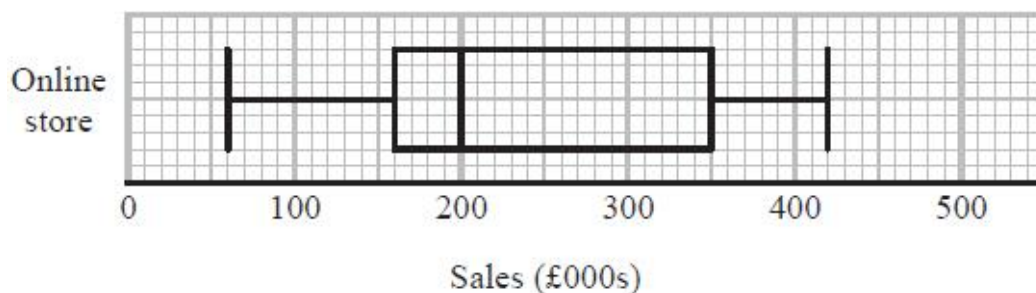
The distance-time graph shows information about part of a car journey.



Use the graph to estimate the speed of the car at time 5 seconds.

Applied: Statistics Practice Questions**Q1.**

The box plot shows information about the sales, in thousands of pounds (£000s), of an online store each month.



Andrew says,

"Three quarters of the given data lies between 160 000 and 350 000 because these are the values of the lower quartile and the upper quartile."

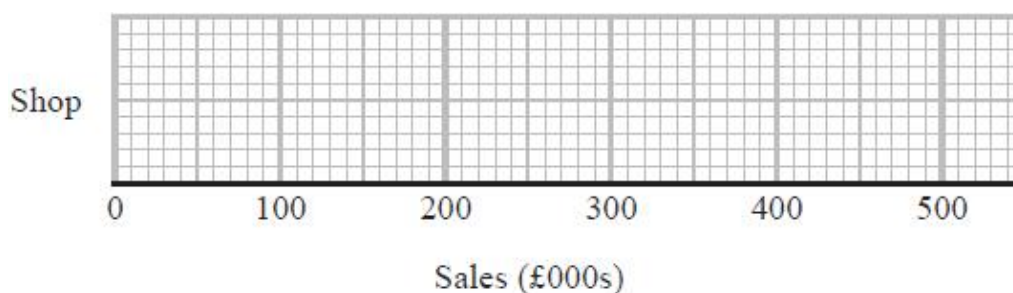
Andrew is wrong.

(a) Explain why.

The table shows information about the sales, in £000s, in a shop each month.

	Sales (£000s)
least value	30
lower quartile	80
median	170
upper quartile	260
greatest value	350

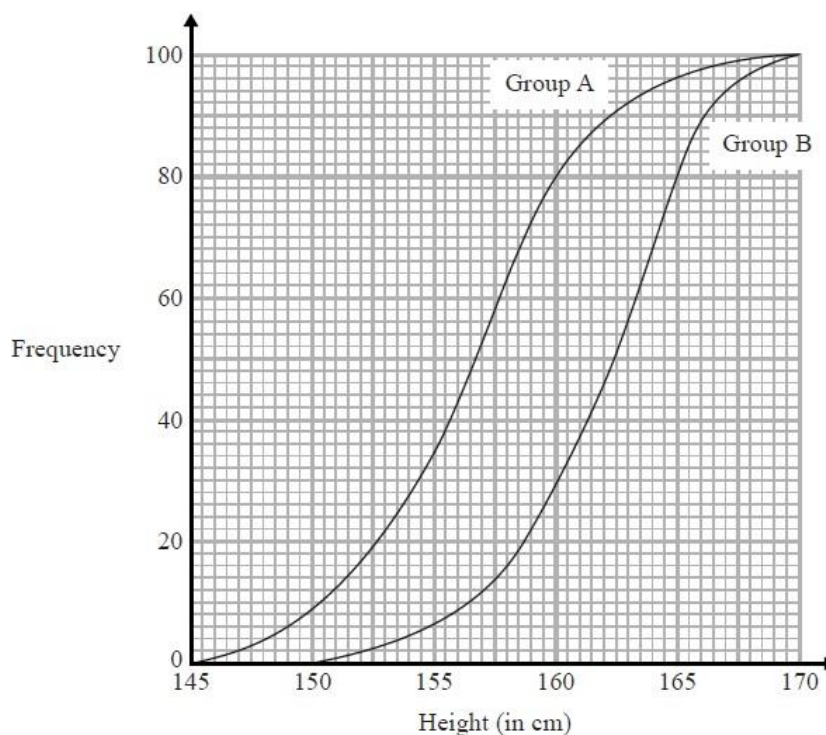
(b) On the grid below, draw a box plot for this information.



(c) Compare the distribution of the sales of the online store with the distribution of the sales in the shop.

Q2.

The cumulative frequency graphs give information about the heights of two groups of children, group A and group B.



Compare the heights of the children in group A and the heights of the children in group B.

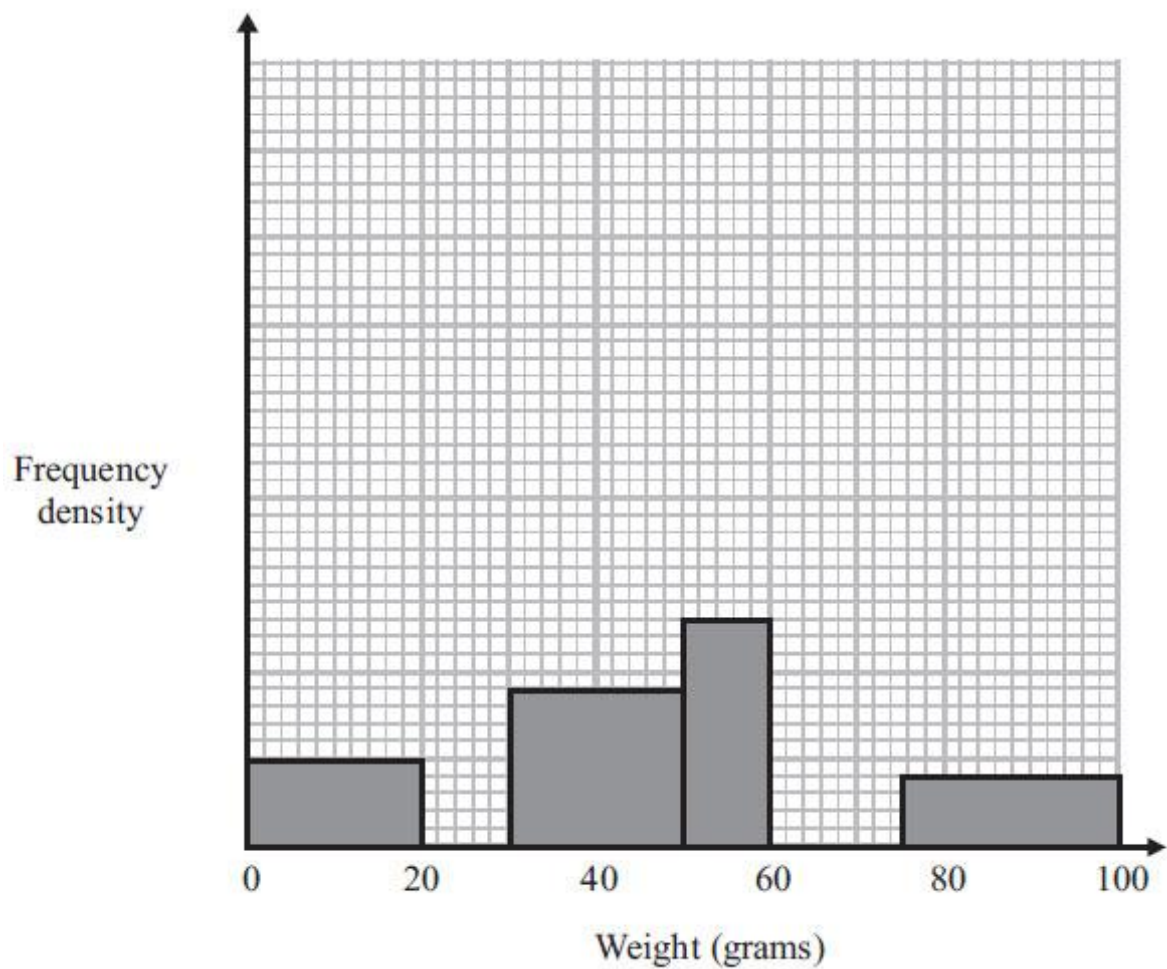
Q3.

The table shows some information about the weights of oranges.

Weight (w grams)	Frequency
$0 < w \leq 20$	
$20 < w \leq 30$	15
$30 < w \leq 50$	
$50 < w \leq 60$	13
$60 < w \leq 75$	15
$75 < w \leq 100$	10

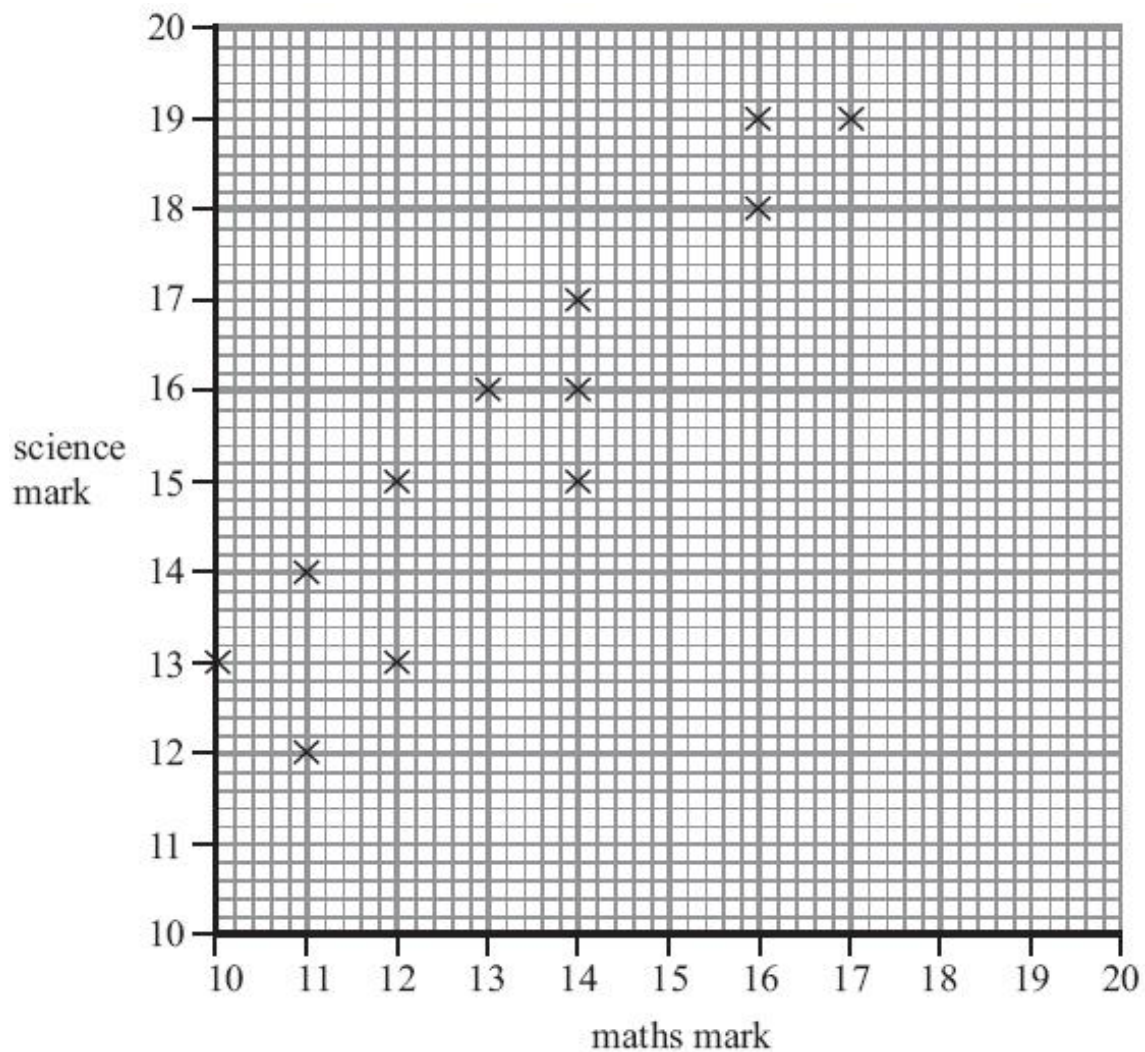
(a) Use the histogram to complete the table.

(b) Use the table to complete the histogram.



Q4.

Mr Kent's students did a maths test and a science test.
The scatter graph shows the marks of 12 of these students.



The table shows the marks of two more students.

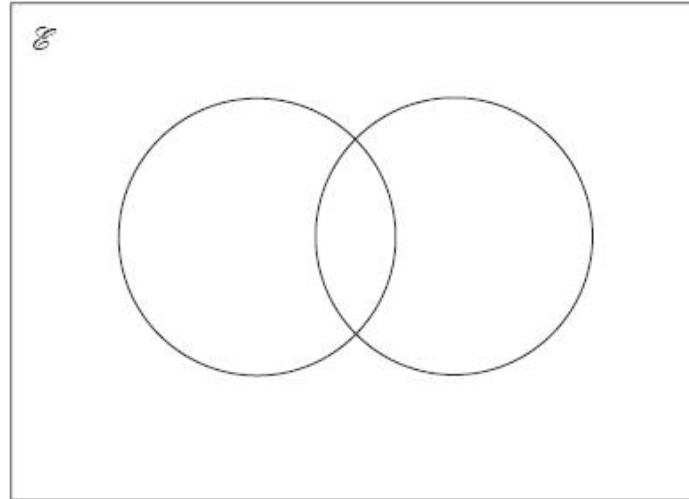
Name	maths	science
Masood	12	14
Nimer	17	20

- (a) Show this information on the scatter graph.
(b) What type of correlation does this scatter graph show?

David did the maths test.
He was absent for the science test.
David's mark in the maths test was 15
(c) Estimate a science mark for David.

Q5. $\mathcal{E}$ = odd numbers less than 30 $A = 3, 9, 15, 21, 27$ $B = 5, 15, 25$

(a) Complete the Venn diagram to represent this information.

A number is chosen at random from the universal set, $\mathcal{E}$.(b) What is the probability that the number is in the set $A \cup B$?**Q6.**

A first aid test has two parts, a theory test and a practical test.

The probability of passing the theory test is 0.75

The probability of passing only one of the two parts is 0.36

The two events are independent.

Work out the probability of passing the practical test.