

1. Simon has an orchard of pear trees.  
He records the total weight of pears, measured to the nearest kilogram, on each tree.  
He makes this table.

Weight of pears per tree (to the nearest kg)	Number of trees	Class mid-point
21 to 30	9	
31 to 40	10	
41 to 50	12	
51 to 60	17	
61 to 70	7	
71 to 80	5	

- (a) Calculate an estimate of the mean weight of pears obtained from a tree.

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- (b) Find the class interval which contains the median.

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2. Calculate, to the nearest penny, the compound interest earned when £800 is invested for 3 years at 6% per annum.

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3. Denise, Heather and Alice share a prize of £4000 in the ratio of 4:5:7. How much does each one get?

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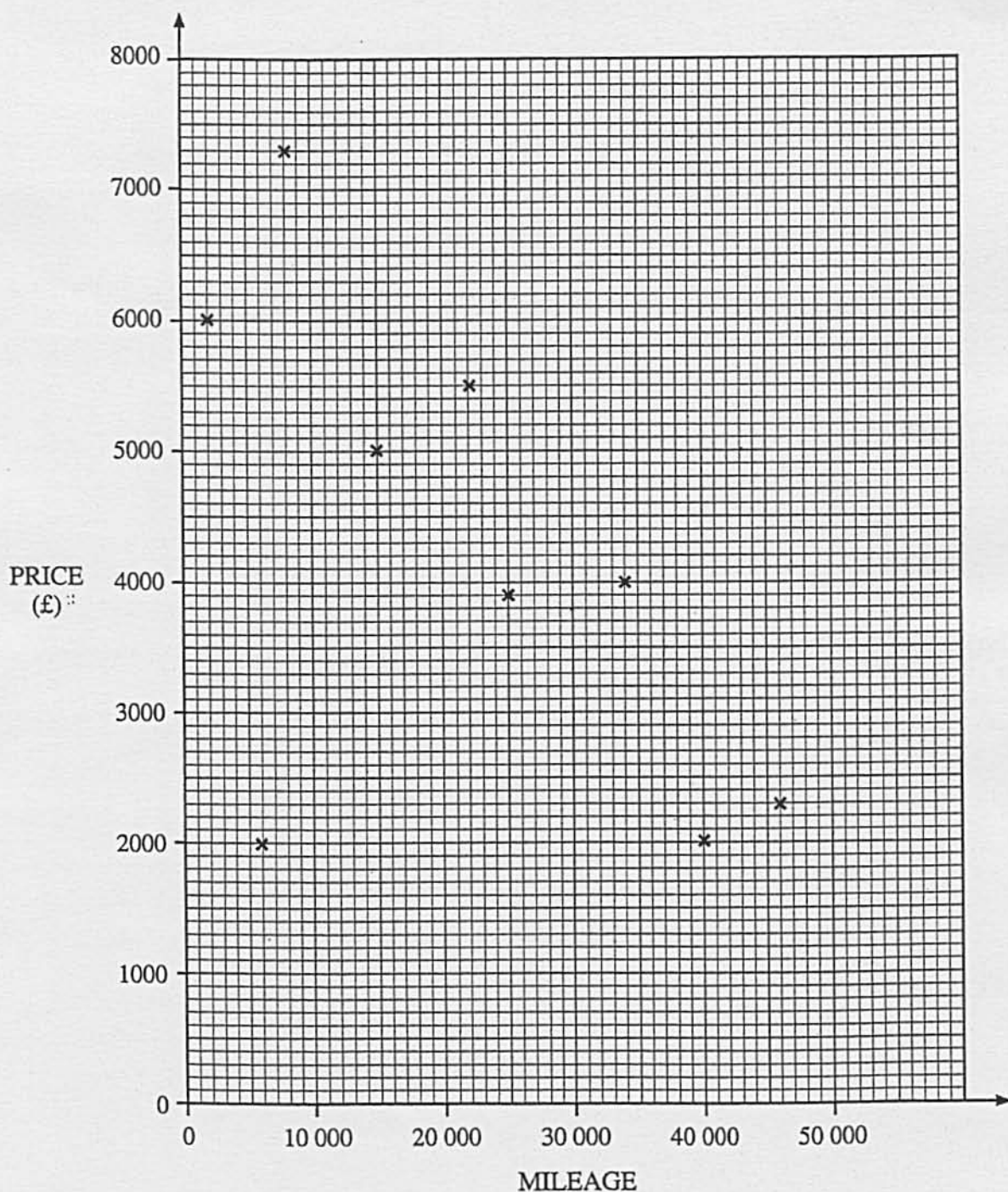
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4. The prices and mileages of second hand cars of a particular make and model were investigated. The table and scatter diagram below shows the results.

Mileage	8000	15 000	25 000	22 000	34 000	2000	40 000	46 000
Price (£)	7300	5000	3900	5500	4000	6000	2000	2300



- (a) The mean mileage of the cars is 24 000 miles and the mean of the prices of the second hand cars is £4500.

Draw a line of best fit on your scatter diagram.

[2]

- (b) Estimate the price of a second hand car that had a mileage of 30 000.

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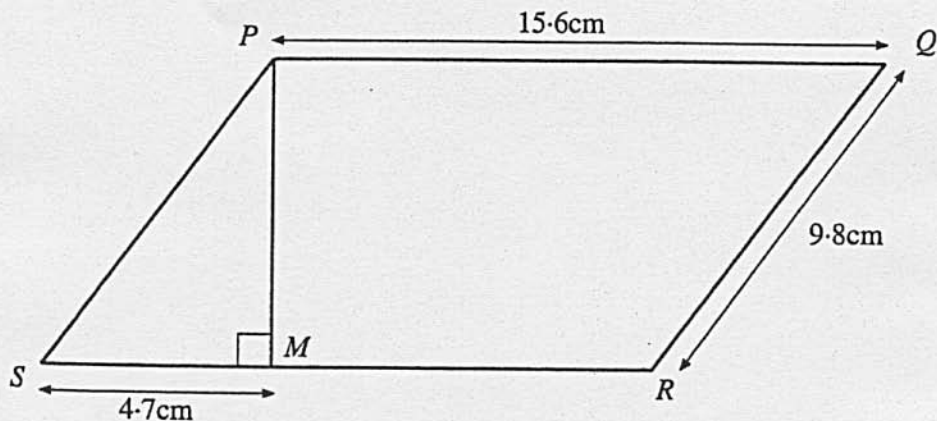
[1]

- (c) Estimate the mileage of a second hand car that had a price of £6600.

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[1]

5.  $PQRS$  is a parallelogram with  $SR = PQ = 15.6$  cm and  $PS = QR = 9.8$  cm.  $M$  is the foot of the perpendicular from  $P$  onto  $SR$  and  $SM = 4.7$  cm.



*Diagram not drawn to scale.*

- (a) Find the length of  $PM$ .

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- (b) Find the area of the parallelogram.

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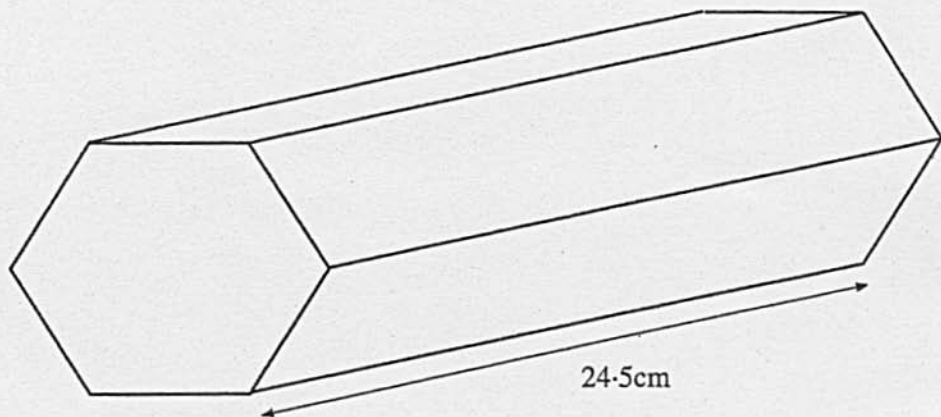
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6.



The diagram represents a prism with a uniform cross-section of area  $145 \text{ cm}^2$ .  
The prism is  $24.5 \text{ cm}$  long and has a mass of  $16.7 \text{ kg}$ .  
Find the density, in  $\text{g/cm}^3$ , of the material from which the prism has been made.

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7. Mrs. Peck bought a computer system for £1856.50, inclusive of V.A.T. at  $17\frac{1}{2}\%$ .  
What is the price of the computer system before V.A.T. is added?

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8. (a) Factorise  $x^2 - 6x + 8$ .

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- (b) Expand the following expression, simplifying your answer as far as possible.

$$(3x - 1)(x + 2)$$

[2]

- (c) Simplify  $\frac{24x^6}{6x^3}$ .

[1]

- (d) Solve the following equation.

$$(x - 2)(x + 5) = 0$$

[2]

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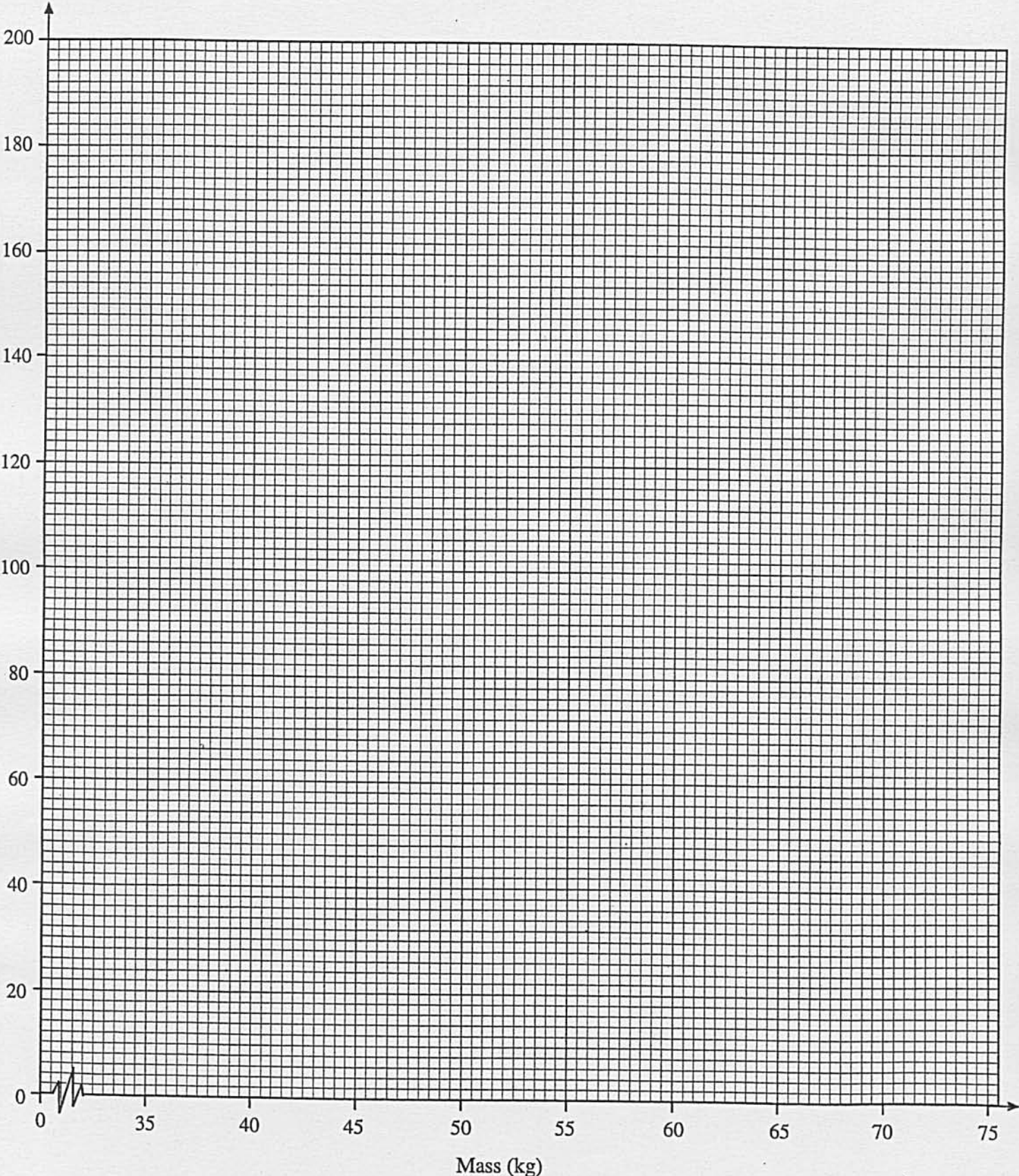
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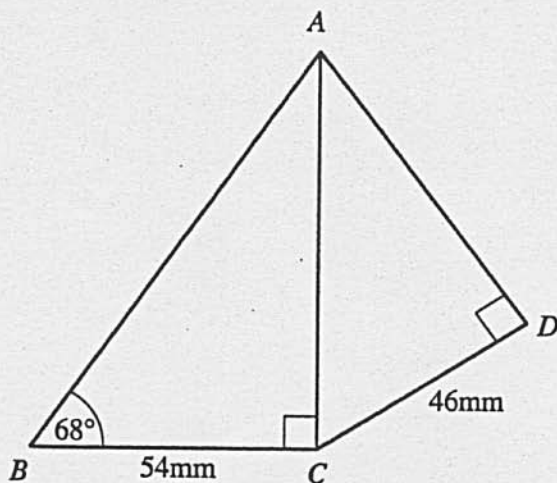
[2]



Cumulative  
Frequency



10. In the diagram below,  $\hat{ACB} = 90^\circ$ ,  $\hat{ADC} = 90^\circ$ ,  $BC = 54\text{ mm}$ ,  $CD = 46\text{ mm}$ , and  $\hat{ABC} = 68^\circ$ .



*Diagram not drawn to scale.*

Calculate the size of  $\hat{DAC}$ .

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11. On the graph paper opposite, draw the region which satisfies all of the following inequalities.

$$\begin{array}{l} x \geq -1 \\ y \leq 3 \\ \text{and } y \geq 2x - 3 \end{array}$$

**Make sure that you clearly indicate the region that represents your answer.**

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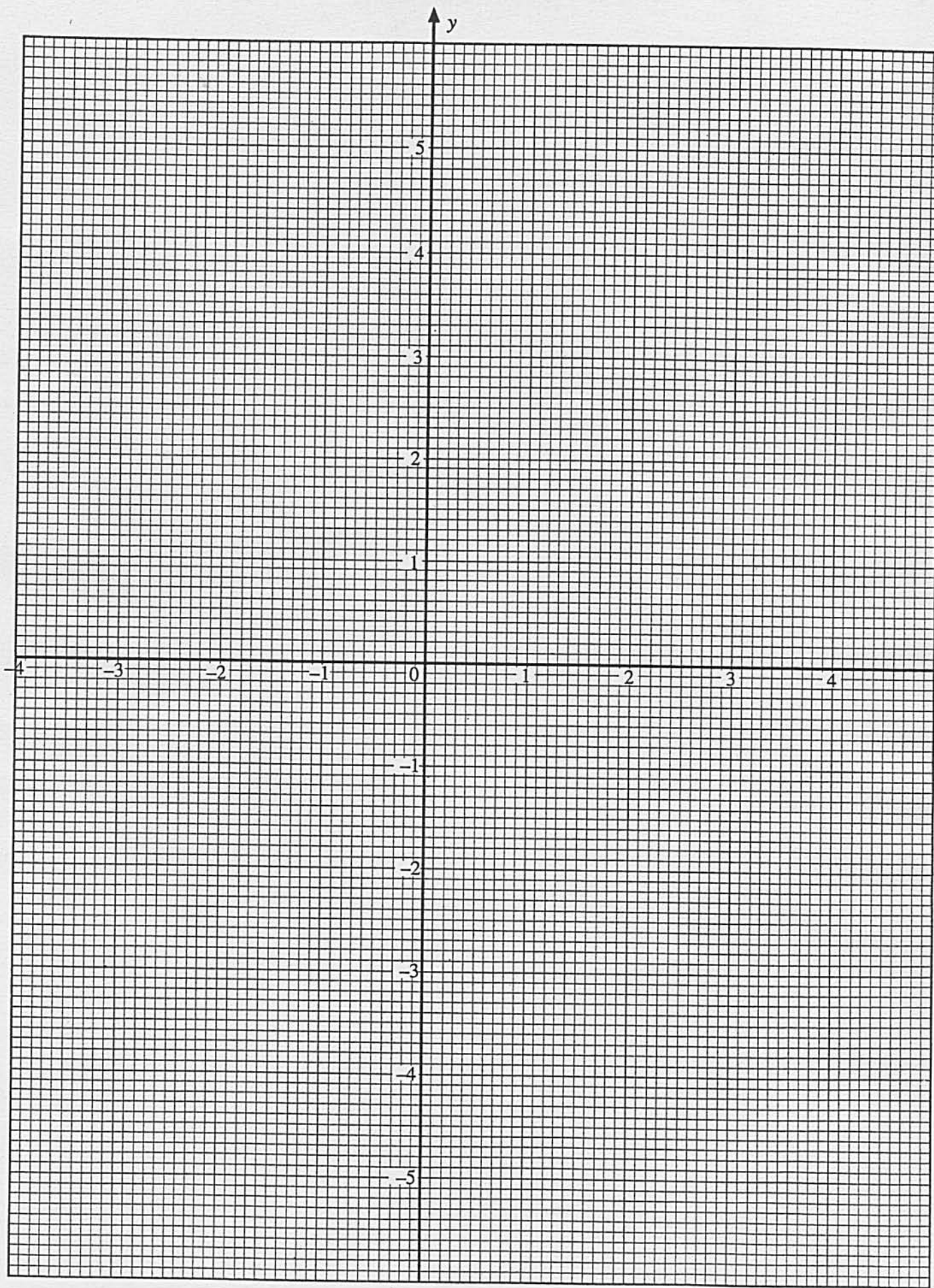
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12. Given that  $y$  is inversely proportional to  $x^3$ , and that  $y = 5$  when  $x = 4$ ,

(a) find an expression for  $y$  in terms of  $x$ ,

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(b) calculate

(i) the value of  $y$  when  $x = 2$ ,

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(ii) the value of  $x$  when  $y = 0.32$ .

[2]



13. (a) Factorise the expression  $15x^2 - 14x - 8$ .

[3]

(b) Solve the equation  $15x^2 - 14x - 8 = 0$ .

[1]

14. In the following expressions  $n$  is any positive integer. State whether each expression is always odd, always even, or sometimes even and sometimes odd. Give reasons for your answer.

(a)  $n(n+1)$

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(b)  $(2n+1)(4n+3)$

[3]

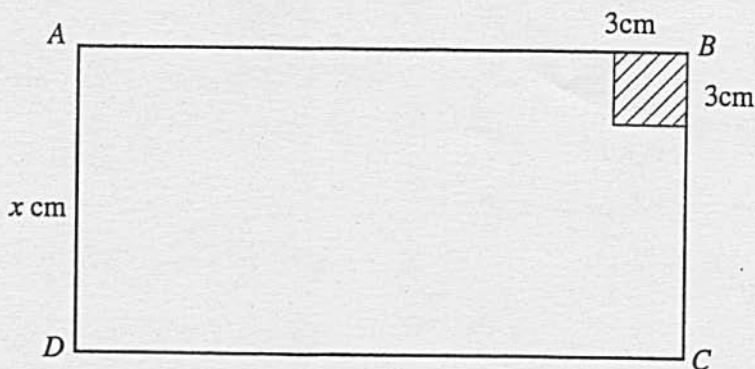
15. In an agricultural experiment a collection of three types of seeds are used, 65% of which are barley seeds, 25% of which are grass seeds and 10% of which are sunflower seeds.

(a) Two seeds are selected at random. Find the probability that neither is a barley seed.

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(b) All the barley seeds germinate. 70% of the grass and 40% of the sunflower seeds germinate. Find the probability that a randomly selected seed germinates.

[3]



*Diagram not drawn to scale.*

$ABCD$  represents a rectangular sheet of metal.  $DC$  is 7 cm longer than  $AD$ . A square of side 3 cm is cut from the rectangle. The area of metal remaining is  $37.5 \text{ cm}^2$ . The length of  $AD$  is  $x$  cm.

- (a) Show that  $x$  satisfies the equation  $x^2 + 7x - 46.5 = 0$ .

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- (b) Solve the equation  $x^2 + 7x - 46.5 = 0$  to calculate the dimensions of rectangle  $ABCD$ , giving your answers correct to 1 decimal place.

[4]

17.  $PQRS$  is a quadrilateral.

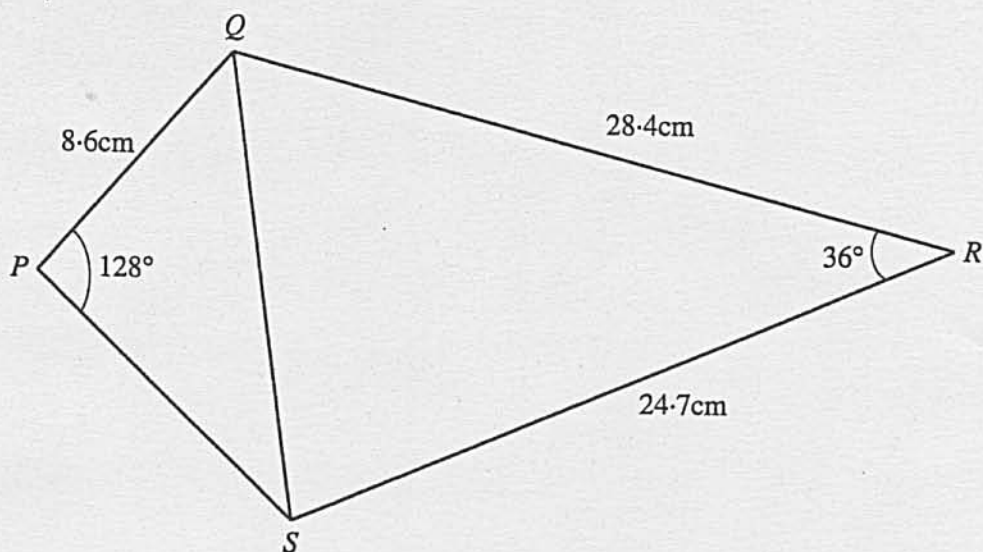


Diagram not drawn to scale.

$$\widehat{SPQ} = 128^\circ \text{ and } \widehat{QRS} = 36^\circ.$$

$$PQ = 8.6\text{ cm}, QR = 28.4\text{ cm and } SR = 24.7\text{ cm}.$$

Find the size of  $\widehat{PSQ}$ .

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18. Shireen measured the heights of 100 plants. A grouped frequency distribution of these heights is given in the table below.

Height in cm	Height mid-point	Number of plants
$1 \leq x < 7$		8
$7 \leq x < 13$		13
$13 \leq x < 19$		22
$19 \leq x < 25$		26
$25 \leq x < 31$		10
$31 \leq x < 37$		12
$37 \leq x < 43$		9

Find an estimate for the standard deviation of the heights of the plants, giving your answer correct to two decimal places.

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19. (a) Express the following as a single fraction in its simplest form.

$$\frac{5}{3x-1} - \frac{4}{2x+3}$$

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- (b) Solve algebraically the inequality  $(x+2)^2 < x+8$ .

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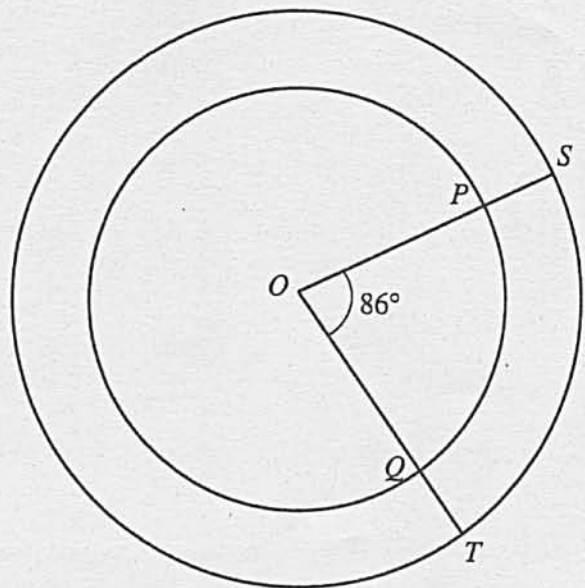


Diagram not drawn to scale.

The diagram shows two concentric circles with centre  $O$ .  
 $OQ$  and  $OP$  are radii of the smaller circle.  
 $OS$  and  $OT$  are radii of the larger circle.  
The radius of the larger circle is  $7.3\text{ cm}$ .  
 $\widehat{POQ} = 86^\circ$ .

- (a) Calculate the area of sector  $SOT$ .

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- (b) The area of the sector  $POQ$  is  $20.3\text{ cm}^2$ . Calculate the radius of this sector  $POQ$ .

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(c) Calculate the area of triangle  $SOQ$ .