

ESTIMATING THE MEAN OF GROUPED DATA

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①

- Robert throws a heavy ball 50 times. The table below shows the distribution of the distances thrown, measured in feet correct to the nearest foot.

	MP	18	23	28	33	38	43
Distance (feet)	16 - 20	21 - 25	26 - 30	31 - 35	36 - 40	41 - 45	
Frequency	12	14	10	8	5	1	

- (a) Calculate an estimate of the mean distance Robert has thrown the ball.

$$18 \times 12 = 216$$

$$23 \times 14 = 322$$

$$28 \times 10 = 280$$

$$33 \times 8 = 264$$

$$38 \times 5 = 190$$

$$43 \times 1 = 43$$

$$\underline{1315}$$

$$\text{Mean} = \frac{1315}{50} = 26.3$$

[4]

②

- The table below shows a grouped frequency distribution of the weights, correct to the nearest kilogram, of 25 dogs.

	MP	3	8	13	18	23
Weight (kg)	1 to 5	6 to 10	11 to 15	16 to 20	21 to 25	
Frequency	5	8	6	4	2	

- (a) Calculate an estimate of the mean weight of the dogs.

$$3 \times 5 = 15$$

$$8 \times 8 = 64$$

$$13 \times 6 = 78$$

$$18 \times 4 = 72$$

$$23 \times 2 = 46$$

$$\underline{275}$$

$$\text{Mean} = \frac{275}{25} = 11 \text{ kg}$$

[4]

- (b) In which class interval is the median weight?

6 to 10 kg

3

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	$25.5 = 229.5$
31 to 40	19	$35.5 = 355$
41 to 50	31	$45.5 = 546$
51 to 60	17	$55.5 = 943.5$
61 to 70	7	$65.5 = 458.5$
71 to 80	5	$75.5 = 377.5$
		<u>2910</u>

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

$$\text{Mean} = \frac{2910}{60} = 48.5 \text{ kg}$$

[3]

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

30th tree is 41 to 50 kg

[1]

(c) Find an estimate for the mean speed of the cars.

$$\frac{7020}{170} = 58.5 \text{ mph}$$

[4]

The speeds of 120 cars on a stretch of motorway were measured and the following results were obtained.

Speed, s (m.p.h.)	Number of cars
$30 \leq s < 40$	6
$40 \leq s < 50$	24
$50 \leq s < 60$	30
$60 \leq s < 70$	45
$70 \leq s < 80$	12
$80 \leq s < 90$	3

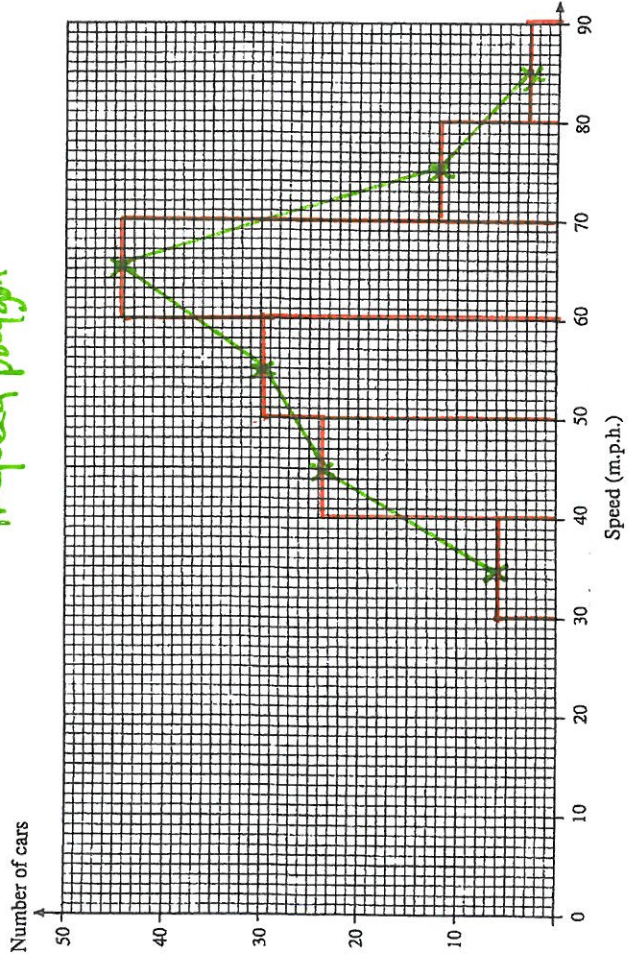
(a) Write down the modal class.

$60 \leq s < 70$

[1]

(b) On the graph paper below, draw a grouped frequency diagram for the data.

frequency polygon

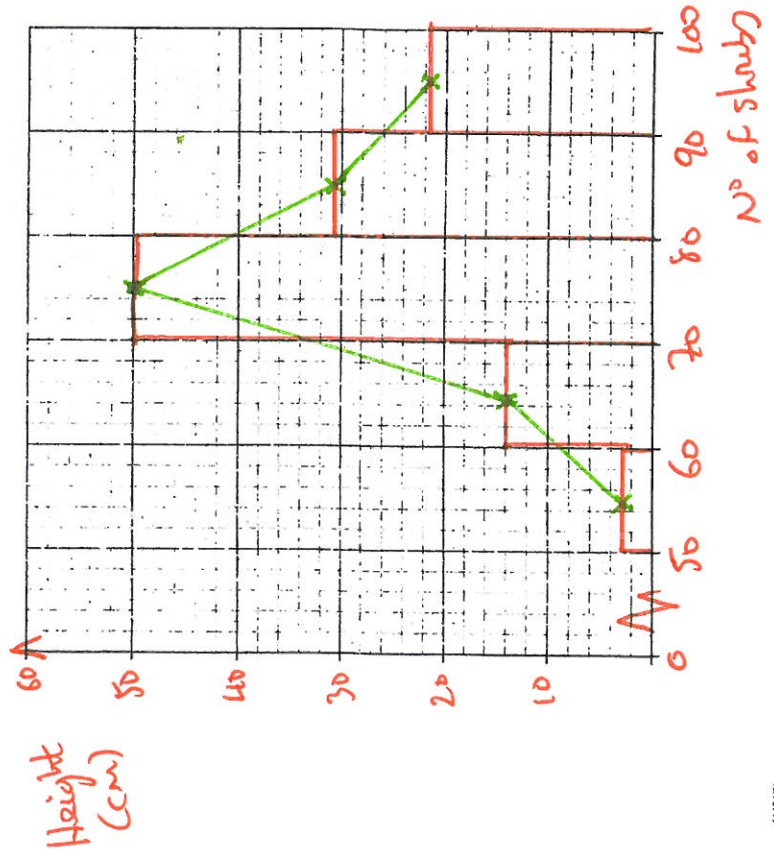


5 The heights of 120 shrubs were measured. The table shows a grouped frequency distribution of the results.

Height (x cm)	Number of shrubs
$50 \leq x < 60$	$55 \times 3 = 165$
$60 \leq x < 70$	$65 \times 4 = 260$
$70 \leq x < 80$	$75 \times 5 = 3750$
$80 \leq x < 90$	$85 \times 31 = 2635 +$
$90 \leq x < 100$	$95 \times 22 = 2090$

frequency polygon

[3]

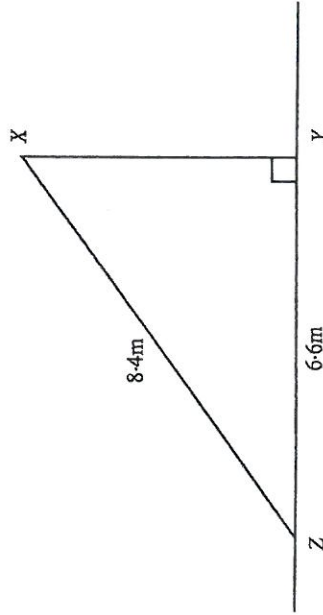


(b) Find an estimate for the mean height of the shrubs.

$$\frac{8900}{120} = 74.16 \text{ cm}$$

[4]

16. One end of a piece of rope 8.4 m long is tied to the top of a vertical pole XY and the other end is tied to the ground at the point Z which is at a horizontal distance of 6.6 m from the foot of the pole. Calculate the height of the pole.



[3]