

Estimating The Mean For Grouped Data

Exercise

1. 20 students scored goals for the school hockey team last month. The table gives information about the number of goals they scored.

| Goals scored | Number of students |
|--------------|--------------------|
| 1 | 9 |
| 2 | 3 |
| 3 | 5 |
| 4 | 3 |

Work out the mean number of goals scored.

2. A teacher asked 50 children how much pocket money they got each week. The table shows some information about their replies.

| Pocket money (£x) | Frequency |
|-------------------|-----------|
| $0 < x \leq 2$ | 1 |
| $2 < x \leq 4$ | 10 |
| $4 < x \leq 6$ | 23 |
| $6 < x \leq 8$ | 14 |
| $8 < x \leq 10$ | 2 |

Work out the estimate for the mean amount of pocket money the children got.

3. John does a survey of the weights of students in his tutor group. The results are summarized in the table. Work out an estimate for the mean weight of a student.

| Weight (w kg) | Frequency |
|------------------|-----------|
| $40 < w \leq 50$ | 4 |
| $50 < w \leq 60$ | 9 |
| $60 < w \leq 70$ | 10 |
| $70 < w \leq 80$ | 5 |

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4. Sarah does a survey of the weights of students in her tutor group. The results are summarized in the table. Work out an estimate for the mean height of a student.

| Height (h cm) | Frequency |
|--------------------|-----------|
| $120 < h \leq 130$ | 3 |
| $130 < h \leq 145$ | 11 |
| $145 < h \leq 160$ | 9 |
| $160 < h \leq 180$ | 7 |

5. Mike does a survey of the weekly wages at a factory. The results are summarized in the table. Work out an estimate for the mean weekly of an employee.

| Wages (W £) | Frequency |
|--------------------|-----------|
| $120 < W \leq 140$ | 10 |
| $140 < W \leq 180$ | 21 |
| $180 < W \leq 200$ | 32 |
| $200 < W \leq 250$ | 25 |
| $250 < W \leq 300$ | 12 |

ESTIMATING THE MEAN FOR GROUPED DATA

EXERCISE

1.

| Goals | Frequency | Freq x Goals |
|---------|-----------|--------------|
| 1 | 9 | 9 |
| 2 | 3 | 6 |
| 3 | 5 | 15 |
| 4 | 3 | 12 |
| Totals: | 20 | 42 |

$$\text{Mean} = \frac{42}{20} = 2.1 \text{ goals}$$

Note: Here we have calculated the mean because we know the data values exactly.

The rest of the questions are based on grouped data so we will be estimating the mean from now on.

ESTIMATING THE MEAN FOR GROUPED DATA

EXERCISE

2.

| Pocket Money £(x) | Frequency | Midpoint | Freq x Midpt |
|----------------------|-----------|----------|--------------|
| $0 < x \leq 2$ | 1 | 1 | 1 |
| $2 < x \leq 4$ | 10 | 3 | 30 |
| $4 < x \leq 6$ | 23 | 5 | 115 |
| $6 < x \leq 8$ | 14 | 7 | 98 |
| $8 < x \leq 10$ | 2 | 9 | 18 |
| | 50 | | 262 |

Estimate for Mean = $\frac{262}{50} = \pounds 5.24$

3.

| Weight (w kg) | Frequency | Midpoint | Freq x Midpt |
|------------------|-----------|----------|--------------|
| $40 < w \leq 50$ | 4 | 45 | 180 |
| $50 < w \leq 60$ | 9 | 55 | 495 |
| $60 < w \leq 70$ | 10 | 65 | 650 |
| $70 < w \leq 80$ | 5 | 75 | 375 |
| Totals | 28 | | 1700 |

Estimate for Mean = $\frac{1700}{28} = 60.71 \text{ kg}$ to 2 d.p.

ESTIMATING THE MEAN FOR GROUPED DATA

EXERCISE

4.

| Height (h cm) | Frequency | Midpoint | Freq x Midpt |
|--------------------|-----------|----------|--------------|
| $120 < h \leq 130$ | 3 | 125 | 375 |
| $130 < h \leq 145$ | 11 | 137.5 | 1512.5 |
| $145 < h \leq 160$ | 9 | 152.5 | 1372.5 |
| $160 < h \leq 180$ | 7 | 170 | 1190 |
| Totals: | 30 | | 4450 |

$$\text{Estimate for Mean} = \frac{4450}{30} = 148.33 \text{ cm} \quad \text{to 2 d.p.}$$

5.

| Wages (W £) | Frequency | Midpoint | Freq x Midpt |
|--------------------|-----------|----------|--------------|
| $120 < W \leq 140$ | 10 | 130 | 1300 |
| $140 < W \leq 180$ | 21 | 160 | 3360 |
| $180 < W \leq 200$ | 32 | 190 | 6080 |
| $200 < W \leq 250$ | 25 | 225 | 5625 |
| $250 < W \leq 300$ | 12 | 275 | 3300 |
| Totals: | 100 | | 19665 |

$$\text{Estimate for Mean} = \frac{19665}{100} = \pounds 196.65$$