

Estimation station and class survey for IGCSE and GCSE: answers

IGCSE Math Revision · IGCSE and GCSE (Higher and Extended) · Teacher answers and notes

The starter is non-calculator. A calculator is allowed in the main activity.

Teacher notes

- Estimation station: set up four or five stations (a desk to measure, a jar of counters, a corridor, a book's thickness, a minute with eyes closed). Students write an estimate first, then measure. Being wrong is the point: celebrate the closest estimate and the best reasoning, not just the right answer, and agree a class norm that a reasoned wrong answer is a good start.
- Class survey: the data in the tasks are made up, so the answers can be checked. Then collect your own class's anonymous data on the board (a show of hands for travel-time groups, hand spans written on sticky notes with no names) and repeat the calculations. Nothing is stored on the site.
- Ask each group which estimate surprised them most, and why: it is a good way to learn names as well as reasoning.

Starter

1. About 1000

- $50 \times 20 = 1000$

2. About 200

- $(600 + 400) \div 5 = 200$

3. 25%

- $30 - 24 = 6$
- $6/24 \times 100 = 25\%$

Task A: Estimation station

a. 25%

- Error = $120 - 90 = 30$ cm
- $30/120 \times 100 = 25\%$

b. Mean 200; 2.0%

- Mean = $1000 \div 5 = 200$
- $(200 - 196)/196 \times 100 = 2.04...\% = 2.0\%$

c. $7.35 \leq T < 7.45$

- Half of 0.1 cm is 0.05 cm either side.

Task B: Class survey: hand spans and travel times

a. Mean 20 cm, median 20 cm, range 6 cm

- Total = 200, so mean = $200 \div 10 = 20$
- In order: 17, 18, 19, 19, 20, 20, 21, 21, 22, 23; median = $(20 + 20) \div 2 = 20$
- Range = $23 - 17 = 6$

b. **17.8 minutes**

- Midpoints 5, 15, 25, 35
- $(6 \times 5 + 9 \times 15 + 7 \times 25 + 3 \times 35) \div 25 = 445 \div 25 = 17.8$

c. **$10 < t \leq 20$**

- The median is the 13th of 25 values.
- Running totals: 6, then 15, so the 13th value is in $10 < t \leq 20$.

d. **129.6°**

- $9/25 \times 360 = 129.6$

Task C: Spot the link

a. **Gradient 0.2; about 20 cm**

- Gradient = $(23 - 17) \div (180 - 150) = 6/30 = 0.2$
- 165 cm is 15 cm past 150 cm: $17 + 0.2 \times 15 = 20$

b. **No**

- 120 cm is outside the range of the data (extrapolation), so the pattern may not hold there.

Extension

1. **Mean 20 cm; range 8 cm**

- $(200 + 16 + 24) \div 12 = 240 \div 12 = 20$
- $24 - 16 = 8$

Every question is original and every answer was recomputed by computer before publishing.