

Estimation station and class survey for IB Maths: answers

IB Math Revision · IB Maths SL and HL (AA and AI) · Teacher answers and notes

The starter is non-calculator. A GDC is needed for tasks B and C.

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.
- For AI students, add Spearman's rank on the class's own data; for everyone, ask which variable should be x and why.

Starter

1. About 400

- $4^2 \times 25 = 400$

2. About 200

- $10 \times 20 = 200$

3. 25%

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

Task A: Estimation station

a. Mean 200; standard deviation 36.3

- Mean = $1000 \div 5 = 200$
- Deviations $-50, 10, -20, 60, 0$; squares add to 6600
- $\sigma = \sqrt{(6600 \div 5)} = \sqrt{1320} = 36.3$

b. 2.04%

- $|200 - 196|/196 \times 100 = 2.04\%$

c. 62.475 m²

- Upper bounds 24.5 m and 2.55 m
- $24.5 \times 2.55 = 62.475$

Task B: Class survey: correlation and regression

a. $r = 0.977$: strong positive correlation

- From the GDC: $r = 0.97725\dots$

b. $s = 0.181h - 10.3$

- From the GDC: $s = 0.180952\dots h - 10.3095\dots$

c. **20.1 cm**

- $0.180952... \times 168 - 10.3095... = 20.09...$

d. **120 cm is outside the data (150-185 cm)**

- That would be extrapolation: the linear pattern may not hold outside the data.

Task C: Travel times

a. **Mean 17.8 minutes; standard deviation 9.6 minutes**

- Midpoints 5, 15, 25, 35 with frequencies 6, 9, 7, 3
- Mean = $445 \div 25 = 17.8$
- $\sigma = \sqrt{(10\,225 \div 25 - 17.8^2)} = \sqrt{92.16} = 9.6$

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

- The median is the 13th value; running totals 6, 15.

Extension

1. **$r = 0.977$ (unchanged); $s = 0.181h - 9.81$**

- Adding 0.5 to every s does not change how the points spread, so r is unchanged.
- The line moves up 0.5: the intercept becomes $-10.3095... + 0.5 = -9.81$

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