

Big tournament statistics for IB Maths SL and HL

IB Math Revision · IB Maths SL and HL (AA and AI) · Student sheet

Name _____

Class _____

Date _____

The starter is non-calculator. A GDC is needed for the main activity.

Starter (5 minutes)

1. Find the mean of 2, 4, 4, 5, 10.
2. Find the median of 3, 8, 1, 9, 4, 7.
3. $Q_1 = 11$ and $Q_3 = 18$. Find the interquartile range.
4. Is a correlation coefficient of -0.9 strong or weak, positive or negative?

Main activity (35 minutes)

Task A: Shots and goals

Made-up data for ten teams in a tournament. Shots on target x : 12, 15, 9, 20, 17, 11, 14, 22, 8, 18. Goals y : 4, 5, 2, 8, 6, 3, 5, 9, 2, 6.

- a. Find the mean number of shots on target and the mean number of goals.
- b. Find Pearson's product-moment correlation coefficient, to 3 significant figures, and describe the correlation.
- c. Find the equation of the regression line of y on x , with coefficients to 3 significant figures. Use it to estimate the goals for a team with 16 shots on target.
- d. Why would it be unwise to use the line to predict the goals for a team with 40 shots on target?

Task B: Goals per match

Made-up goals in 40 matches: 0 goals in 4 matches, 1 in 9, 2 in 11, 3 in 8, 4 in 5, 5 in 2 and 6 in 1.

- a. Find the mean and the standard deviation of the number of goals per match, each to 3 significant figures.
- b. Model the goals in a match by a Poisson distribution with mean 2.275. How many of the 40 matches would the model expect to have no goals? Give 3 significant figures.
- c. Using the model, find $P(X \geq 4)$, to 3 significant figures, and compare with the data.

Task C: The 100 m final

In a made-up championship, sprinters' 100 m times are modelled by $T \sim N(10.2, 0.15^2)$ seconds.

- a. Find $P(T < 10.0)$, to 3 significant figures.
- b. The fastest 5% of times win a medal place. Find the qualifying time, to 3 significant figures.
- c. Eight sprinters run independently. Find the probability that at least one runs under 10.0 s.

Extension

1. Goals in different matches are independent, each $Po(2.275)$. Find the probability of exactly 6 goals in total in 3 matches, to 3 significant figures.