A-Level Starter Activity

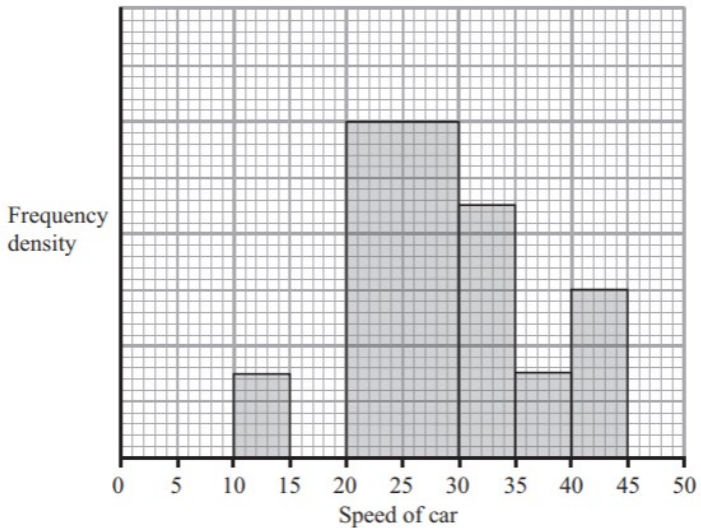
Jethwa Maths

Topic: Histograms

Chapter Reference: Statistics 1, Chapter 2

7 minutes

1. A policeman records the speed of the traffic on a busy road with a 30 mph speed limit. He records the speeds of a sample of 450 cars. The histogram in the figure below represents the results.



a. Calculate the number of cars that were exceeding the speed limit by at least 5 mph in the sample. **(3)**
b. Estimate the value of the mean speed of the cars in the sample. **(3)**
c. Estimate, to 1 decimal place, the value of the median speed of the cars in the sample. **(2)**
d. State, with a reason, whether the estimate of the mean or median is a better representation of the average speed of the traffic on the road. **(2)**

Solutions

1a.

One large square = $\frac{450}{22.5}$	**M1**
One large square = 20 cards	**M1**
Number of cars above 35 mph = 4.5 x 20 = 90 cars	**M1**

1b.

$\bar{x} = \frac{30\times12.5+240\times25+90\times32.5+30\times37.5+60\times42.5}{250}$	**M1**
$\bar{x}$ = 28.83….	**M1**
$\bar{x}$ = 28.8	**M1**

1c.

$Q_2 = 20 + \frac{195}{240} \times 10$	**M1**
Q_2 = 28.125 = 28.1	**M1**

1d.

If the data is equally distributed, use the median as it is not affected by extreme values.	**M1**
If the data is symmetrical, use the mean as all the data is used.	**M1**