

A histogram showing the frequency density of car speeds. The x-axis is labeled 'Speed of car' and ranges from 0 to 50 with major grid lines every 5 units and minor grid lines every 1 unit. The y-axis is labeled 'Frequency density' and ranges from 0 to 1.0 with major grid lines every 0.2 units and minor grid lines every 0.02 units. The histogram consists of six bars with the following approximate values:

Speed Range (km/h)	Frequency Density
10 - 15	0.1
20 - 30	0.8
30 - 35	0.6
35 - 40	0.1
40 - 45	0.4

- Calculate the number of cars that were exceeding the speed limit by at least 5 mph in the sample. (3)
- Estimate the value of the mean speed of the cars in the sample. (3)
- Estimate, to 1 decimal place, the value of the median speed of the cars in the sample. (2)
- 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)

This image shows a blank sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper has a slight shadow on the right side, suggesting it's part of a bound notebook.

Solutions

1a.

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

1b.

$\bar{x} = \frac{30 \times 12.5 + 240 \times 25 + 90 \times 32.5 + 30 \times 37.5 + 60 \times 42.5}{250}$	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

