Representations of data - Questions

June 2017 Mathematics Advanced Paper 1: Statistics and Mechanics 1

1.

2. An estate agent is studying the cost of office space in London. He takes a random sample of 90 offices and calculates the cost, £x per square foot. His results are given in the table below.

Cost (£x)	Frequency (f)	Midpoint (£y)
$20 \leqslant x < 40$	12	30
$40 \leqslant x < 45$	13	42.5
$45 \leqslant x < 50$	25	47.5
$50 \leqslant x < 60$	32	55
$60 \leqslant x < 80$	8	70

(You may use $\sum f \, y^2 = 226\ 687.5$)

A histogram is drawn for these data and the bar representing $50 \leqslant x < 60$ is 2 cm wide and 8 cm high.

(a) Calculate the width and height of the bar representing $20 \leqslant x < 40$

(3)

(b) Use linear interpolation to estimate the median cost.

(2)

(c) Estimate the mean cost of office space for these data.

(2)

(d) Estimate the standard deviation for these data.

(2)

(e) Describe, giving a reason, the skewness.

(1)

Rika suggests that the cost of office space in London can be modelled by a normal distribution with mean £50 and standard deviation £10.

(f) With reference to your answer to part (e), comment on Rika's suggestion.

(1)

(g) Use Rika's model to estimate the 80th percentile of the cost of office space in London.

(3)