

爱德思
Statistics 1
分类真题
2014-2022 册

A Level Clouds 出品

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Chapter 1

Measures and Representations of Data

2. A rugby club coach uses club records to take a random sample of 15 players from 1990 and an independent random sample of 15 players from 2010. The body weight of each player was recorded to the nearest kg and the results from 2010 are summarised in the table below.

Body weight (kg)	75–79	80–84	85–89	90–94	95–99	100–104	105–109
Number of Players (2010)	1	2	2	4	3	2	1

- (a) Find the estimated values in kg of the summary statistics a , b and c in the table below.

	Estimate in 1990	Estimate in 2010
Mean	83.0	<i>a</i>
Median	82.0	<i>b</i>
Variance	44.0	<i>c</i>

Give your answers to 3 significant figures.

(6)

The rugby coach claims that players' body weight increased between 1990 and 2010.

- (b) Using the table in part (a), comment on the rugby coach's claim.

(2)

8. A manager records the number of hours of overtime claimed by 40 staff in a month.

The histogram in Figure 1 represents the results.

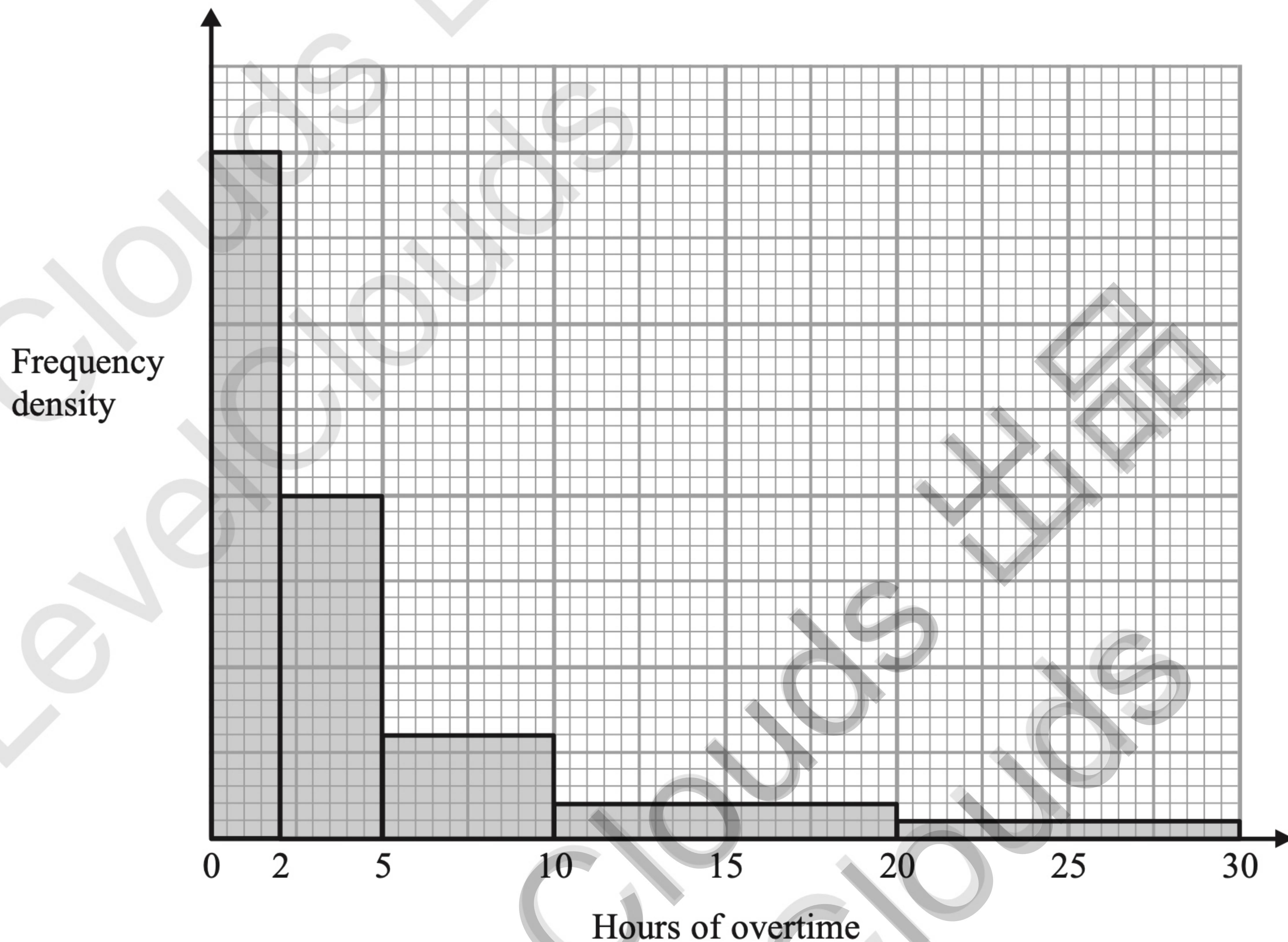


Figure 1

- (a) Calculate the number of staff who have claimed less than 10 hours of overtime in the month. (4)
- (b) Estimate the median number of hours of overtime claimed by these 40 staff in the month. (2)
- (c) Estimate the mean number of hours of overtime claimed by these 40 staff in the month. (2)

The manager wants to compare these data with overtime data he collected earlier to find out if the overtime claimed by staff has decreased.

- (d) State, giving a reason, whether the manager should use the median or the mean to compare the overtime claimed by staff. (2)

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2. The table below shows the distances (to the nearest km) travelled to work by the 50 employees in an office.

Distance (km)	Frequency (f)	Distance midpoint (x)
0 – 2	16	1.25
3 – 5	12	4
6 – 10	10	8
11 – 20	8	15.5
21 – 40	4	30.5

[You may use $\sum fx = 394$, $\sum fx^2 = 6500$]

A histogram has been drawn to represent these data.

The bar representing the distance of 3 – 5 has a width of 1.5 cm and a height of 6 cm.

- (a) Calculate the width and height of the bar representing the distance of 6 – 10

(3)

- (b) Use linear interpolation to estimate the median distance travelled to work.

(2)

- (c) (i) Show that an estimate of the mean distance travelled to work is 7.88 km.

(4)

- (ii) Estimate the standard deviation of the distances travelled to work.

(2)

- (d) Describe, giving a reason, the skewness of these data.

(2)

Peng starts to work in this office as the 51st employee.

She travels a distance of 7.88 km to work.

- (e) Without carrying out any further calculations, state, giving a reason, what effect Peng's addition to the workforce would have on your estimates of the

- (i) mean,

- (ii) median,

- (iii) standard deviation

of the distances travelled to work.

(3)

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6. Yujie is investigating the weights of 10 young rabbits. She records the weight, x grams, of each rabbit and the results are summarised below.

$$\sum x = 8360 \quad \text{and} \quad \sum (x - \bar{x})^2 = 63840$$

- (a) Calculate the mean and the standard deviation of the weights of these rabbits.

(3)

Given that the median weight of these rabbits is 815 grams,

- (b) describe, giving a reason, the skewness of these data.

(2)

Two more rabbits weighing 776 grams and 896 grams are added to make a group of 12 rabbits.

- (c) State, giving a reason, how the inclusion of these two rabbits would affect the mean.

(2)

- (d) By considering the change in $\sum (x - \bar{x})^2$, state what effect the inclusion of these two rabbits would have on the standard deviation.

(2)

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2. The time taken to complete a puzzle, in minutes, is recorded for each person in a club. The times are summarised in a grouped frequency distribution and represented by a histogram.

One of the class intervals has a frequency of 20 and is shown by a bar of width 1.5 cm and height 12 cm on the histogram. The total area under the histogram is 94.5 cm^2

Find the number of people in the club.

(3)