Lesson Worksheet 6.4A(I)

Objective: To choose a suitable measure of central tendency

(a) Mean 平均數

◀ It is the most commonly used measure of central tendency. 它是最常用的集中趨勢量度。

◀ It can be easily affected by extreme value(s). 它較容易受極端值影響。

(b) Median 中位數

◀ It is not easily affected by extreme value(s). 它不容易受極端值影響。

◀ For ungrouped data, if the number of data is large, it is tedious to arrange the data in ascending or descending order. 對於不分組數據，當數據的數目很大時，把數據排序將變得繁複。

◀ For data grouped into intervals, the median can only be obtained from a graph. 對於以區間分組的數據，中位數只能從圖像中獲得。

(c) Mode/Modal class 眾數/眾數組

◀ It is not easily affected by extreme value(s). 它不容易受極端值影響。

◀ If the frequency of the mode (modal class) is relatively low, mode (modal class) may not be a good measure of central tendency. 若眾數（眾數組）的頻率相對較低，眾數（眾數組）並非一個適合的集中趨勢的量度。

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1. The weights of 10 parcels are 32 kg, 32 kg, 32 kg, 34 kg, 35 kg, 36 kg, 36 kg, 38 kg, 40 kg, 40 kg.

    (a) Find the *mean* and the *median* weight of the parcels.

    (b) Which measure in **(a)** is more suitable to reflect the central tendency of the weights of parcels? Explain your answer.
哪個在 **(a)** 部的量度較適合反映這些包裹重量的集中趨勢？試解釋你的答案。

(a)   mean

    = _____35.5_____ kg

    median

    $= \dfrac{(\ 35\ ) + (\ 36\ )}{2}$

    = _____35.5_____ kg

(b)   Since there is ____no extreme value____ in the set of data

    the ____mean____ and the ____median____ are all suitable

    to reflect the central tendency of the weights of the parcels.

由於數據組中並沒有極端值，所以平均數和中位數都適合反映這些包裹重量的集中趨勢。

Demonstration

Consider the set of data 6, 6, 6, 8, 9, 10, 11, 12, 13, 89.

(a) Find the mean and the median of the set of data.

(b) Which measure(s) in **(a)** is more suitable to reflect the central tendency of the set of data? Explain your answer.

Solution

(a) mean =

$\dfrac{6\times3+8+9+10+11+12+13+89}{10}$

    = <u>17</u>

median = $\dfrac{9+10}{2}$

    = <u>9.5</u>

(b) Since the mean obtained is affected by the extreme value '89', the mean is not suitable to reflect the central tendency of the set of data. The median is more

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central tendency(集中趨勢)   measure(量度)   extreme value(極端值)
mean (平均值)   median (中位數)   mode (眾數)

2. The monthly numbers of robbery in a city in 2015 are shown below.

11, 20, 11, 25, 28, 17, 19, 23, 16, 22, 21, 26

(a) Find the *median* and *mode* of the monthly numbers of robbery in the city.

(b) Which measure in **(a)** is more suitable to reflect the central tendency of the monthly numbers of robbery? Explain your answer.

哪個在 **(a)** 部的量度較適合反映每月搶劫案的數目的集中趨勢？試解釋你的答案。

(a) ①   11, 11, 16, 17, (19), (20), (21), 22, 23, 25, 26, 28

②   median = $\dfrac{(20) + (21)}{2}$ = 20.5

mode = 11

(b) Since the ___frequency___ of the mode is relatively ___low___, it is not suitable to reflect the central tendency of the monthly numbers of robbery. The ___median___ is more suitable to reflect the central tendency of the monthly numbers of robbery.

由於眾數的___頻率___相對___較低___，所以眾數並不適合反映每月搶劫案的數目的集中趨勢。___中位數___較適合反映每月搶劫案的數目的集中趨勢。

3. The ages of twelve people are 21, 22, 22, 24, 25, 27, 28, 29, 30, 31, 32, 33.

(a) Find the *mean* and the *mode* of the ages of these people.

(b) Which measure in **(a)** is more suitable to reflect the central tendency of the ages of these people? Explain your answer.

哪個在 **(a)** 部的量度較適合反映這些人士的年齡的集中趨勢？試解釋你的答案。

(a) mean = 27

mode = 22

(b) Since the ___frequency___ of the mode is relatively ___low___, it is not suitable to reflect the central tendency of the ages of the people. The ___mean___ is more suitable to reflect the central tendency of the ages of the people.

由於眾數的頻率相對較低，所以眾數並不適合反映這些人士的年齡的集中趨勢。平均數較適合反映這些人士的年齡的集中趨勢。

central tendency(集中趨勢)　　　　　measure(量度)　　　　　extreme value(極端值)
mean (平均值)　　　　　　　　　　median (中位數)　　　　　mode (眾數)

4. The following shows the ages of some children in a church.

Age	7	8	9	10	11
Number of children	8	10	18	25	14

(a) Find the *mean*, the *median* and the *mode* of the ages of the children in the church.

(b) Which measures in **(a)** is/are suitable to reflect the central tendency of the ages of the children in the church?

哪個在 **(a)** 部的量度較適合反映這教會的兒童的年齡的集中趨勢？

(a) mean = _____9.36_____

Total number of children = _____75_____

median = the ___38th___ datum = ___10___

mode = ___10___

(b) The ___mean___, the___median___ and the ___mode___ are all suitable to reflect the central tendency of the ages of the children in the church.

___平均數、中位數和眾數___ 都適合反映這教會的兒童的年齡的集中趨勢。

5. There are five high schools in a district. The annual school fees of the high schools are as follows:
$5000, $29 000, $37 600, $ 33 000, $38 750

(a) Find the *mean*, the *median*, and the *mode* of the annual school fee of the high schools.

(b) Which measure in **(a)** is more suitable to reflect the central tendency of the annual school fees? Explain your answer.

哪個在 **(a)** 部的量度較適合反映這些高等院校每年的學費的集中趨勢？試解釋你的答案。

(a) mean = $___28670___

① $5000, $29 000, $(___33 000___), $(___37 600___), $38 750

median = $___33 000___

mode = ___no___

(b) Since the mean obtained is affected by the extreme value '$5000', the mean is not suitable to reflect the central tendency of the annual school fee. The ___median___ is more suitable to reflect the central tendency of the annual school fee.

由於所得的平均數受極端值「$5000」影響，平均數並不適合反映這些高等院校的每年學費的集中趨勢。

___中位數___較適合反映些高等院校的每年學費的集中趨勢。

central tendency(集中趨勢)   measure(量度)   extreme value(極端值)
mean (平均值)   median (中位數)   mode (眾數)

6. The following shows the monthly salaries of eight employees in a company.

$30 000, $22 000, $55 000, $22 000, $24 000, $19 000, $20 000, $25 000

(a) Find the *mean*, the *median* and the *mode* of the monthly salaries of the employees in the company.

(b) Which measures in **(a)** is/are suitable to reflect the central tendency of the monthly salaries of the employees in the company? Explain your answer.

哪個在 **(a)** 部的量度較適合反映公司的這些員工的月薪的集中趨勢？試解釋你的答案。

(a) mean = $ _____27125_____

① $19 000, $20 000, $22 000, $(__22000__), $(__24000__), $25 000, $30 000, $55 000

median = $ \dfrac{(\quad 22000 \quad) + (\quad 24000 \quad)}{2} = $ _____23 000_____

mode = $ _____22 000_____

(b) Since the mean obtained is affected by the extreme value '$55 000', the mean is not suitable to reflect the central tendency of the salaries.

Since the frequency of the mode is relatively low, the mode is not suitable to reflect the central tendency of the salaries.

The _____median_____ is more suitable to reflect the central tendency of the salaries.

由於所得的平均數受極端值「$55 000」影響，平均數並不適合反映月薪的集中趨勢。

由於眾數的頻率相對較低，所以眾數並不適合反映月薪的集中趨勢。

_____中位數_____較適合反映月薪的集中趨勢。

central tendency(集中趨勢)　　　　measure(量度)　　　　extreme value(極端值)
mean (平均值)　　　　　　　　　median (中位數)　　　　mode (眾數)

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