Let's have a Math Chat

Proper Use (善用) and Misuse (誤用) of Statistical Diagrams (統計圖)

Proper Use of Statistical Diagrams

Misuse of Statistical Diagrams

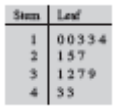
Proper Use of Statistical Diagrams

How do we **use (運用)** the statistical diagrams **properly (正確地)**?

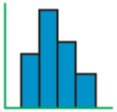
Proper Use of Statistical Diagrams

We need to choose a **suitable (適當) statistical diagram (統計圖)** to **present (表達)** the data so that we can **interpret the diagram (闡釋圖像)** to obtain **useful information (有用的資料)**.

The following table shows the **characteristics (特點)** of **different (不同)** statistical diagrams:

Statistical diagram	Characteristics
 Bar chart棒形圖	Present data of **items (項目)** and show its **distribution (分佈)**.
 Pie chart圓形圖	Present the **share (分配) of each item (每個項目)** in **proportion (比例)** to the angle of sector.
 Stem-and-leaf diagram 幹葉圖	**Shows (顯示) any particular datum (任何一個數據)** in a set of data.

Proper Use of Statistical Diagrams

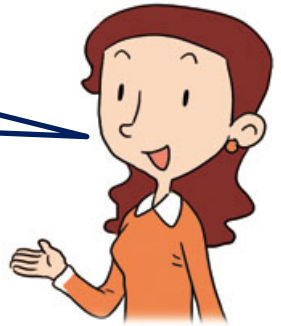
Statistical diagram	Characteristics
 Broken-line graph 折線圖	Present how the data **change (變化)** over a period of time **(一段時間)**.
 Scatter diagram 散點圖	**Investigate (研究)** the **relationship (關係)** between **two sets of related data (兩組相關數據)**.
 Histogram 組織圖	Present the **frequency distribution (頻數分佈)** of a set of **continuous data (連續數據)**.
 Frequency polygon or curve 頻數多邊形或曲線	Present the **frequency distribution (頻數分佈)** of a set of **continuous data (連續數據)**.
 Cumulative frequency polygon or curve累積頻數多邊形或曲線	Present the **cumulative frequency distribution (累積頻數分佈)** of a set of **continuous data (連續數據)** and helps find the **percentiles (百分位數)** of a set of continuous data.

Misuse of Statistical Diagrams

What is the **problem (問題)** of **misuse (誤用)** of statistical diagrams?

Misuse of Statistical Diagrams

Some statistical diagrams may lead us to a **wrong interpretation (錯誤的闡釋)**.



Therefore, we should **pay attention (留意)** to the following before we interpret the statistical diagram.

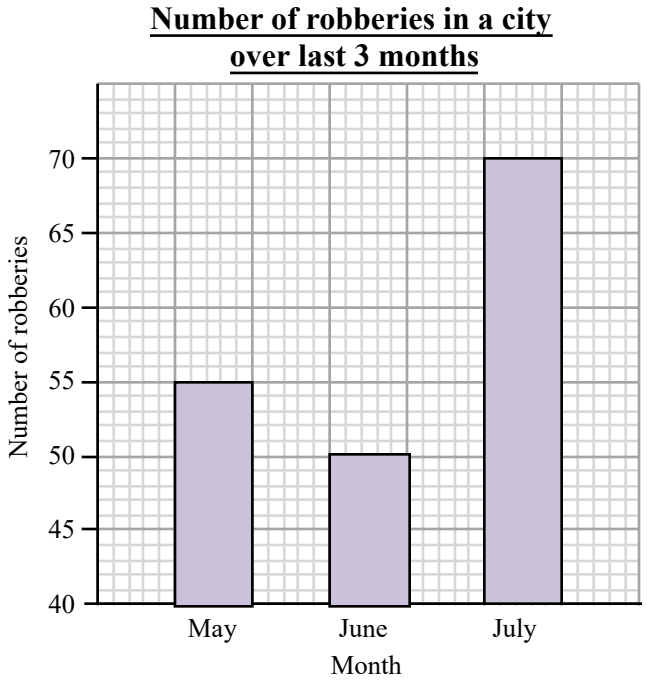
(i) The **heights of bars (棒條的高度)** in statistical diagrams are **proportional to (成比例)** the **frequency (相應的頻數)**.

(ii) The **sizes of the symbols (圖形的大小)** used in statistical diagrams are **appropriate (合適)**.

Misuse of Statistical Diagrams

Example 1

The bar chart shows the number of robberies in a city over last 3 months.



(a) From the graph, find the ratio of the lengths of bars representing the number of robberies in May and July.

(b) According to the graph, the Commissioner of Police claims that the number of robberies in July is double that in May. Do you agree? Explain your answer.

Misuse of Statistical Diagrams

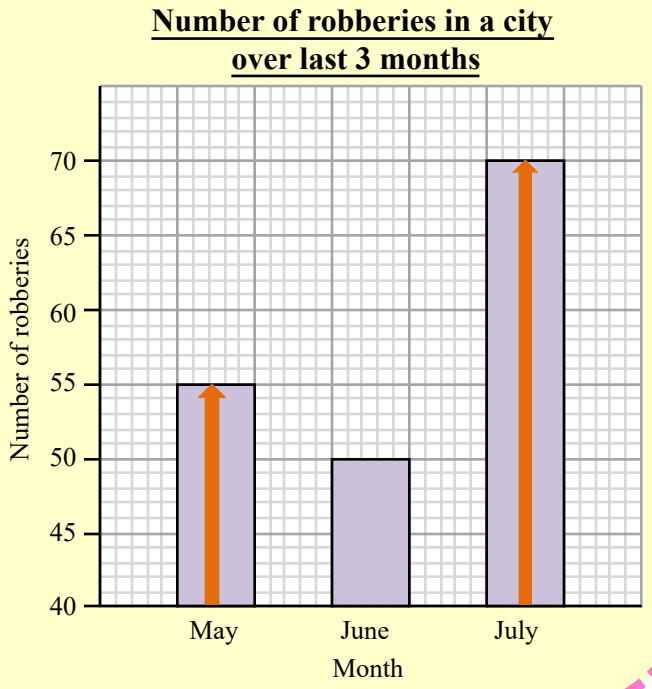
Example 1

(a) From the graph, find the **ratio of the lengths of bars (棒條的長度的比)** representing the number of robberies in May and July.

(a) From the graph,

the required ratio = 3 units : 6 units

= 1 : 2



Misuse of Statistical Diagrams

Example 1

(b) According to the graph, the Commissioner of Police claims that the **number of robberies (搶劫案宗數)** in July is **double (兩倍)** that in May. Do you agree? Explain your answer.

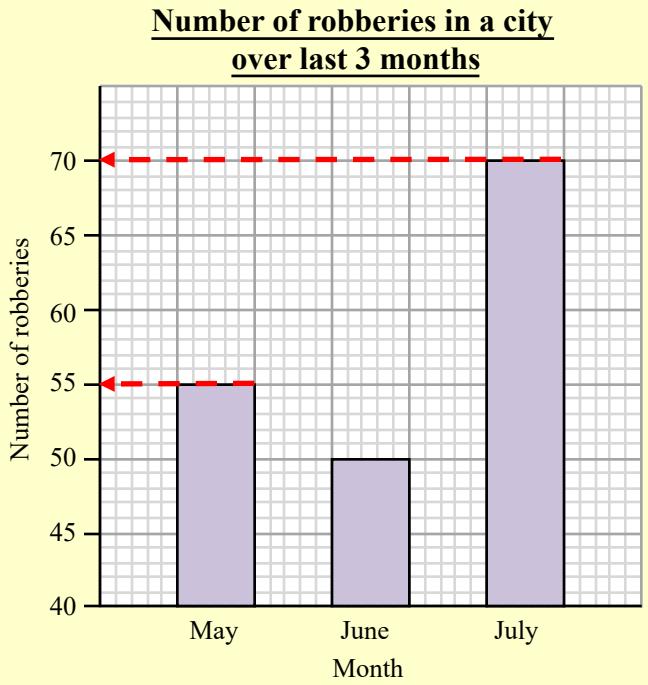
(b) From the graph,

number of robberies in May = 55

number of robberies in July = 70

Ratio of the number of robberies in May and July $= \frac{55}{70}$

$= \frac{11}{14} \neq 1 : 2$



$\therefore$ The number of robberies in July is not double that in May.

Misuse of Statistical Diagrams

Example 2

The number of bottles of soybean milk of three various brand sold is a supermarket this week is shown below.

Brand	A	B	C
Number of bottles sold	600	400	500

Suggest **which (哪個)** of the following two diagrams is **more suitable (較為合適)** for **presenting (表達)** the above data. Explain your answer.

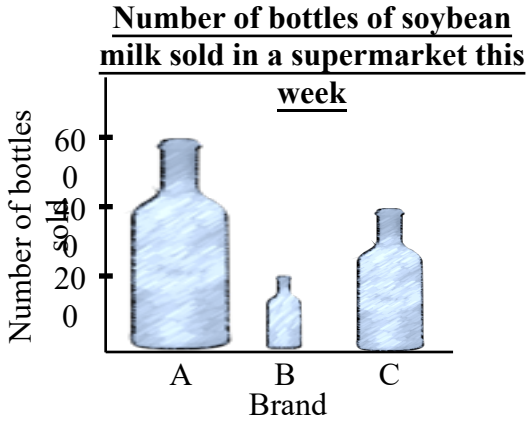


Fig. 1

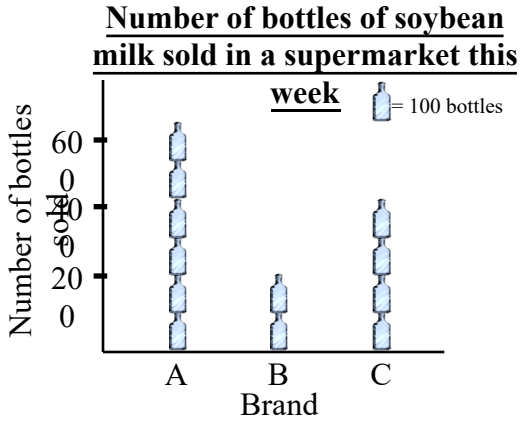


Fig. 2

Misuse of Statistical Diagrams

Example 2

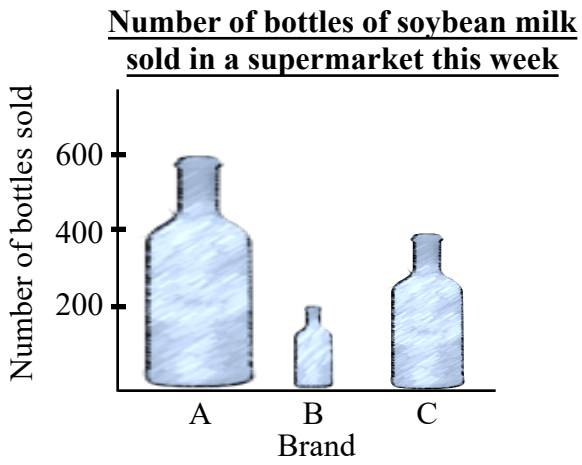


Fig. 1

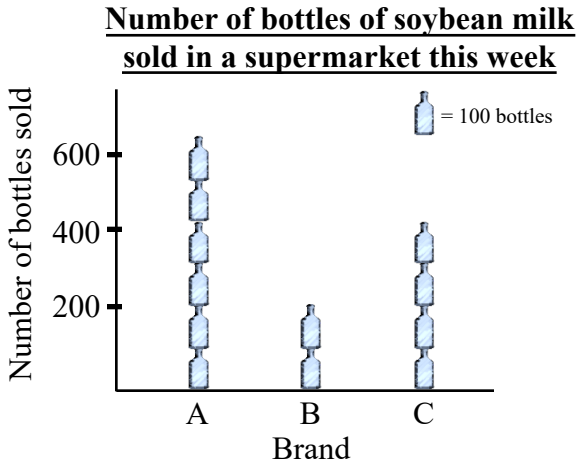


Fig. 2

Fig. 2 is more suitable because the sizes of **all (所有)** the **symbols (圖形)** used are the **same (大小一樣)**, making it **easier (較易)** for readers to **associate (連繫)** the **total height (總高度)** of the symbols with **the number of bottles sold (銷售量).**