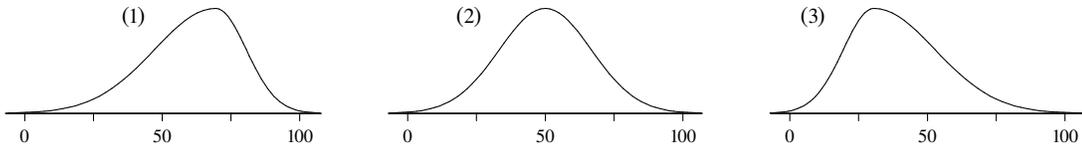


4. Below are sketches of the histograms for three data sets.
- (a) In scrambled order, the averages are: 40, 50, 60; match the histograms with the averages.
 - (b) The standard deviation of histogram (3) is closest to: 5, 15, 50? Choose one option and explain briefly.
 - (c) The standard deviation of histogram (1) is *a lot* smaller than that of histogram (3): **True** or **False**? Explain briefly.

MARKS
3
(1, 1, 1)



- (a) (2) has average 50 by *symmetry*; (1) has average 60 and (3) has 40 because the average of (1) is *greater* than the average of (3).
- (b) S.d. of (3) is closest to 15, because the ‘average’ deviation from the average is clearly more than 5 but less than 50.
- (c) **False** – the two distributions are *mirror images* of each other and so have closely *similar* standard deviations.

MARKS
2

5. The average and median salaries of major league baseball players in 1993 were \$490,000 and \$1,160,000. Which of these two values is the average and which is the median? Explain your reasoning briefly.

The distribution of players’ salaries has a lower limit of 0 (in principle) and a long *right* tail, corresponding to the small proportion of highly-paid exceptional players. Because the distribution is skewed to the *right*, the average is *greater than* the median. Hence, of the two numbers given, \$1,160,000 is the average and \$490,000 is the median.

\$ 1,160,000

Average

\$ 490,000

Median

MARKS
4
(1, 2, 1)

6. In a large class, the female students averaged 160 cm in height, with a standard deviation of 8 cm; the male students averaged 175 cm in height with a standard deviation of 8 cm.
- (a) If there were 150 females and 150 males in the class, find the average height of all 300 class members.
 - (b) For all 300 class members, the standard deviation of height will be: (1) quite a bit **less** than 8 cm; (2) about 8 cm; (3) quite a bit **more** than 8 cm. Choose **one** of these three options and explain your reasoning briefly.
 - (c) If there were 200 females and 100 males in the class, find the average height of all 300 class members.

(a) With **equal** numbers of females and males: $\text{average height} = \frac{160+175}{2} = 167.5 \text{ cm.}$

167.5 cm

 (a)
Average

(b) The combination of two distributions with *different* averages will be **more** spread out, so the standard deviation for all 300 students will be **more** than 8 cm = **option (3)**.

(3)

 (b)
Option number

(c) With 200 females and 100 males: $\text{average height} = \frac{200 \times 160 + 100 \times 175}{300} = 165 \text{ cm.}$

165 cm

 (c)
Average