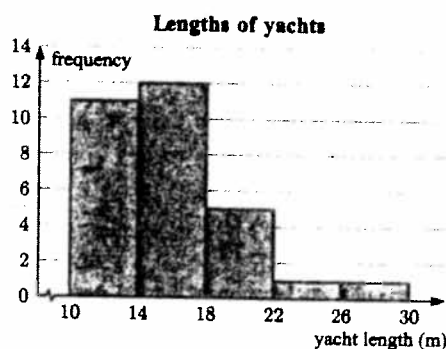


## REVIEW SET 6A

- 1
- a quantitative discrete
  - b quantitative continuous
  - c categorical
  - d categorical
  - e categorical
  - f quantitative continuous
  - g quantitative continuous
  - h quantitative discrete
  - i quantitative discrete
- 2 a  $n = 30$ , so  $\sqrt{n} \approx 5.48$   
 $\therefore$  we require about 5 classes

Length (m)	Tally	Frequency
$10 \leq l < 14$		11
$14 \leq l < 18$		12
$18 \leq l < 22$		5
$22 \leq l < 26$		1
$26 \leq l < 30$		1
	Total	30



- b
- i  $n = 30$ , so  $\frac{n+1}{2} = 15.5$ .  
 $\therefore$  the median is the average of the 15th and 16th values (when in order).  
 $\therefore$  median =  $\frac{14.4 + 14.6}{2} = 14.5$  m
  - ii range = max - min  
 $= 27.4 - 10.1$   
 $= 17.3$  m
  - c The data is positively skewed.
- 3 mean =  $\frac{2 + a + 5 + \dots + 5}{8} = 3$   
 $\therefore \frac{a + 22}{8} = 3$   
 $\therefore a + 22 = 24$   
 $\therefore a = 2$
- 4 a The data is negatively skewed, as the left side of the graph is 'stretched'.

Score	Freq.	Cumul. freq.
$0 < x \leq 4$	3	3
$4 < x \leq 8$	7	10
$8 < x \leq 12$	11	21
$12 < x \leq 16$	14	35
$16 < x \leq 20$	5	40

21 students scored under 13 (that is, 12 or less) marks.

So,  $40 - 21 = 19$  students scored 13 or more marks.

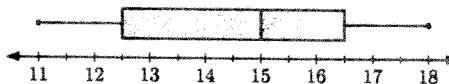
$\frac{19}{40} = 0.475 \therefore 47.5\%$  of students scored 13 or more marks.

c 3 students scored less than 5 marks.

$\frac{3}{40} = 0.075 \therefore 7.5\%$  of students scored less than 5 marks.

d We do not know all the data values exactly, only the class intervals they fall into.

5 11 12 12 13 14 14 15 15 15 16 17 17 18  
 ↑     ↑     ↑     ↑     ↑  
 min    $Q_1 = 12.5$    median    $Q_3 = 16.5$    max



6 a median = score for CF of 60  
 $\approx 77$  days

b IQR = (score for CF of 90) – (score for CF of 30)  
 $\approx 83 - 71$   
 $\approx 12$  days

7 a  $\bar{x} \approx 122, s_n \approx 7.94$

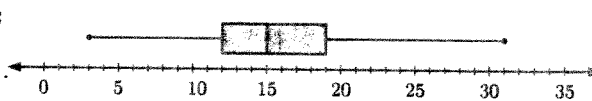
b  $\bar{x} \approx 7.01, s_n \approx 0.984$

8 a Listed in order:

3 7 8 10 11 13 14 14 14 15 15 16 18 18 19 19 19 22 28 31  
 ↑     ↑     ↑     ↑     ↑  
 min    $Q_1$    median    $Q_3$    max

$\therefore \min = 3, Q_1 = \frac{11 + 13}{2} = 12, \text{ median} = 15, Q_3 = 19 \text{ and } \max = 31$

b range = max – min  
 $= 31 - 3$   
 $= 28$   
 IQR =  $Q_3 - Q_1$   
 $= 19 - 12$   
 $= 7$



**REVIEW SET 6B**

- 1 a quantitative continuous     b categorical     c categorical  
 d quantitative continuous     e quantitative continuous     f quantitative discrete  
 g categorical

2 a highest = 97.5 m, lowest = 64.6 m

b Using technology:

   |  $\bar{x} \approx 81.1$  m     || median  $\approx 83.1$  m

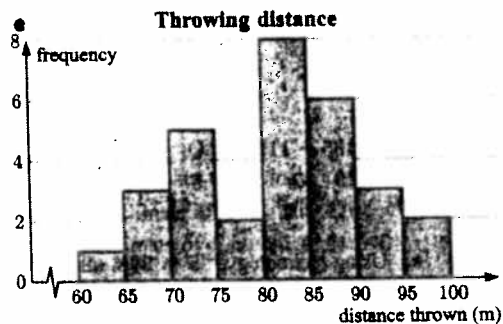
c The range =  $97.5 - 64.6 = 32.9$

So, if intervals of length 5 are used we need about 7 of them.

We choose  $60 \leq d < 65, 65 \leq d < 70, 70 \leq d < 75,$  and so on.

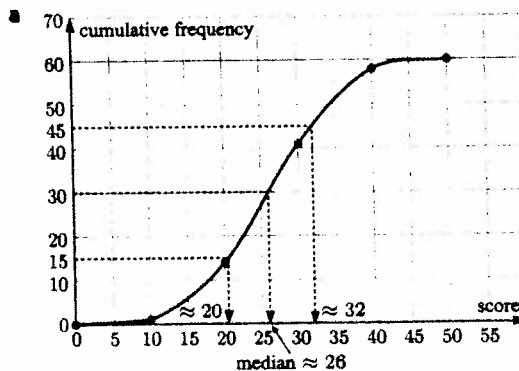
**d**

Distance (m)	Tally	Freq. ( <i>f</i> )
$60 \leq d < 65$		1
$65 \leq d < 70$		3
$70 \leq d < 75$		5
$75 \leq d < 80$		2
$80 \leq d < 85$		8
$85 \leq d < 90$		6
$90 \leq d < 95$		3
$95 \leq d < 100$		2
Total		30



**3**

Scores	<i>f</i>	Cumul. freq.	Midpoint
0 - 9.9	1	1	4.95
10 - 19.9	13	14	14.95
20 - 29.9	27	41	24.95
30 - 39.9	17	58	34.95
40 - 49.9	2	60	44.95
Total	60		



- b**
- i median  $\approx 26$  {see graph}
  - ii IQR =  $Q_3 - Q_1$   
 $=$  (score for CF of 45)  
 $-$  (score for CF of 15)  
 $\approx 32 - 20 \approx 12$

Using technology:

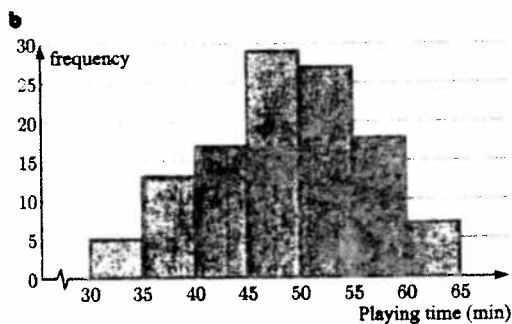
- iii  $\bar{x} \approx 26.0$
- iv  $s_n \approx 8.31$

- 4** Using technology:
- a i £352.50      ii £336      iii £365.50
  - b IQR =  $Q_3 - Q_1 = 365.5 - 336 = £29.50$
  - c  $\bar{x} \approx £350, s_n \approx £17.80$

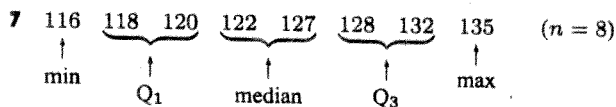
- 5**
- a When  $t = 20$ , CF  $\approx 108$  and when  $t = 10$ , CF  $\approx 20$ .  
 So, approximately  $108 - 20 \approx 88$  students spent between 10 and 20 minutes travelling to school.
  - b If 30% of students spent more than  $m$  minutes, 70% of students spent less than  $m$  minutes.  
 70% of 200 students = 140 students.  
 When CF = 140,  $t \approx 24$  minutes  $\therefore m \approx 24$ .

**6**

Playing time (min)	Midpoint (min)	CF
$30 \leq t < 35$	32.5	5
$35 \leq t < 40$	37.5	13
$40 \leq t < 45$	42.5	17
$45 \leq t < 50$	47.5	29
$50 \leq t < 55$	52.5	27
$55 \leq t < 60$	57.5	18
$60 \leq t < 65$	62.5	7



- a Estimate of  $\mu$  is  $\bar{x} \approx 48.6$  minutes  
 Estimate of  $\sigma$  is  $s_n \approx 7.63$  minutes
- c Negatively skewed, since the left hand side of the graph is 'stretched'.



$$\begin{aligned} \text{range} &= 135 - 116 = 19 & Q_1 &= \frac{118 + 120}{2} = 119 & Q_3 &= \frac{128 + 132}{2} = 130 & s_n &\approx 6.38 \quad \{\text{using technology}\} \end{aligned}$$

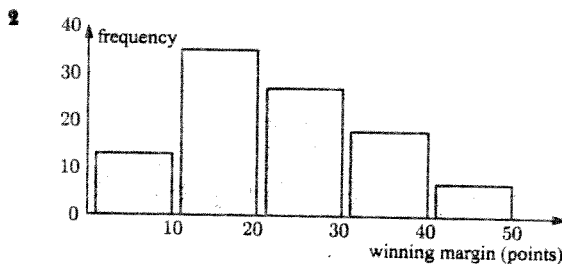
- 8
- a Using technology,  $\bar{x} \approx 29.6$  allsorts and  $s_n \approx 1.61$  allsorts.
  - b The sample mean is less than 30, which does not justify the confectioner's claim. However, it is within a standard deviation and only 184 bags were sampled, so further investigation is needed before a definite conclusion can be reached.

**REVIEW SET 6C**

1

$$\begin{aligned} \text{mean} &= \frac{6 + 8 + 7 + \dots + 7 + p + q}{14} = 7 \\ \therefore \frac{82 + p + q}{14} &= 7 \\ \therefore 82 + p + q &= 98 \\ \therefore p + q &= 16 \quad \dots (1) \end{aligned}$$

Not including  $p$  and  $q$ , there are four values of '6' and four values of '7'.  
 Since the mode is 7 only, there must be more 7s than 6s, so  $p$  or  $q$  or both are 7.  
 Say  $p$  is 7.  $\therefore q = 9$  {from (1)}  
 So,  $p$  and  $q$  are 7 and 9.



3 Use technology, or

Midpoint ( $x$ )	$f$	$fx$
274.5	14	3843
324.5	34	11 033
374.5	68	25 466
424.5	72	30 564
474.5	54	25 623
524.5	23	12 063.5
574.5	7	4021.5
$\Sigma$	272	112 614

$$\begin{aligned} \bar{x} &= \frac{\Sigma fx}{\Sigma f} \\ &= \frac{112\,614}{272} \\ &\approx 414 \text{ patrons} \end{aligned}$$

4 a Reading from the boxplots:

	A (s)	B (s)
Min	11	11.2
Q <sub>1</sub>	11.6	12
Median	12	12.6
Q <sub>3</sub>	12.6	13.2
Max	13	13.8

- b
- i range of A = 13 - 11 = 2 s
  - ii IQR of A = 12.6 - 11.6 = 1 s
  - range of B = 13.8 - 11.2 = 2.6 s
  - IQR of B = 13.2 - 12 = 1.2 s

- c
- i We know the members of squad A generally ran faster because their median time is lower.
  - ii We know the times in squad B are more varied because their range and IQR are higher.

Bill (£)	Mid-interval value	Frequency
70 - 79.99	74.995	27
80 - 89.99	84.995	32
90 - 99.99	94.995	48
100 - 109.99	104.995	25
110 - 119.99	114.995	37
120 - 129.99	124.995	21
130 - 139.99	134.995	18
140 - 149.99	144.995	7

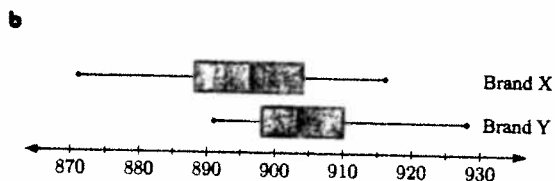
Then using technology:

estimate of  $\mu$  is  $\bar{x} \approx \text{€}104$   
 estimate of  $\sigma$  is  $s_n \approx \text{€}19.40$

- 6 Let the number of marks be  $x$ .
- a When  $x = 45$ ,  $CF \approx 120$  students  
 $\therefore$  about 120 students scored 45 marks or less.
  - b When  $CF = 400$ ,  $x \approx 65$  marks  
 $\therefore$  the median mark was about 65 marks.
  - c 25% of 800 = 200 and 75% of 800 = 600.  
 So, when  $CF = 200$ ,  $x \approx 54$  and when  $CF = 600$ ,  $x \approx 75$   
 $\therefore$  the middle 50% of results lie between 54 and 75 marks.
  - d  $IQR \approx 75 - 54 \approx 21$  marks
  - e When  $x = 55$ ,  $CF \approx 215$   
 $\therefore$  about  $\frac{215}{800} \approx 27\%$  of students scored less than 55  
 $\therefore$  about 73% of students scored 55 or more.
  - f 10% of 800 students = 80 students  
 When  $CF = 800 - 80 = 720$ ,  $x \approx 82$  marks  
 $\therefore$  a score of 82 marks is required for a 'distinction'.

- 7 a Using technology:

	Brand X	Brand Y
min	871	891
$Q_1$	888	898
median	896.5	903.5
$Q_3$	904	910
max	916	928
IQR	16	12



- c i Brand Y has more peanuts per jar as the median is higher.
- ii Brand X has a more consistent number of peanuts per jar. The IQR is lower, which indicates less variation.