

Homework

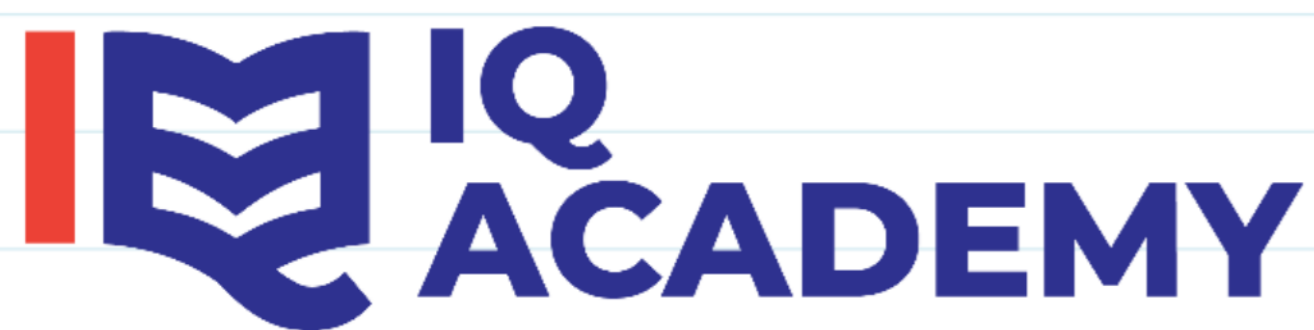


Use the Excel program and manual calculations to solve the numerical exercises:

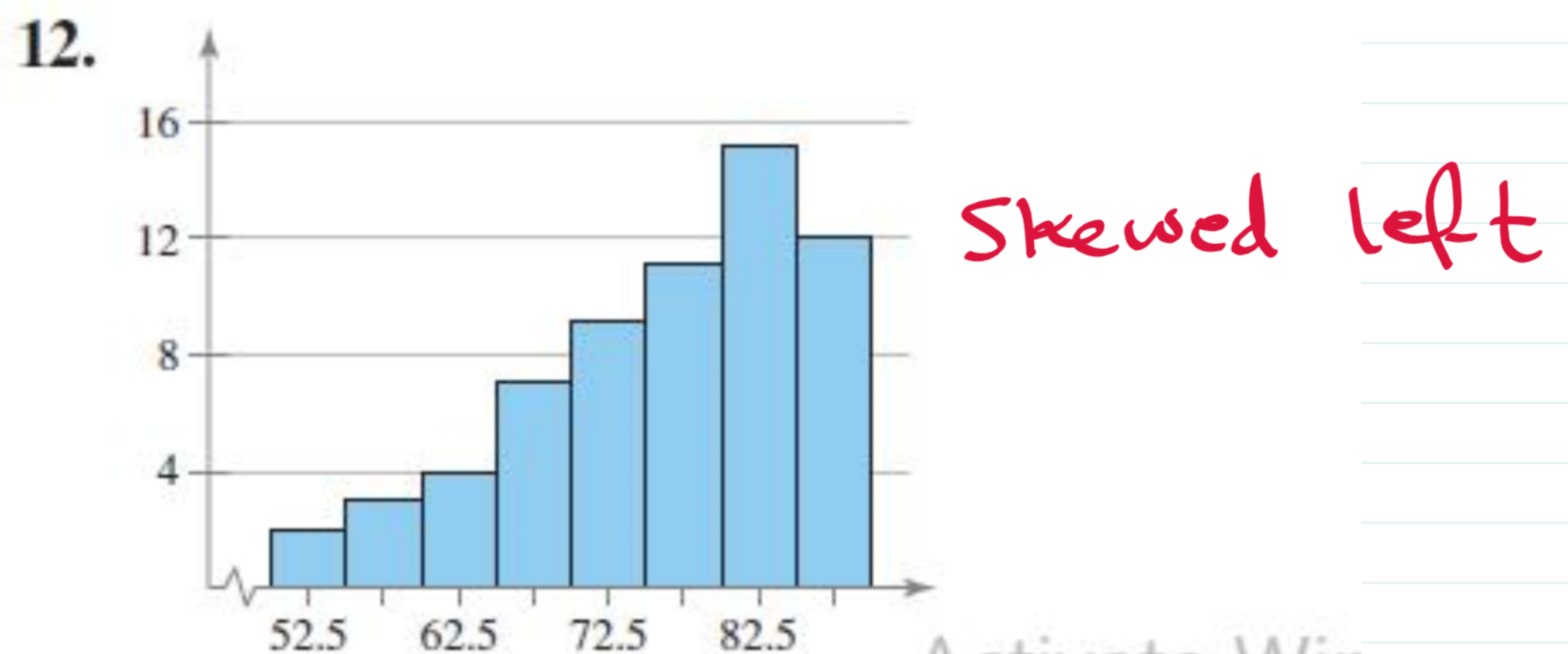
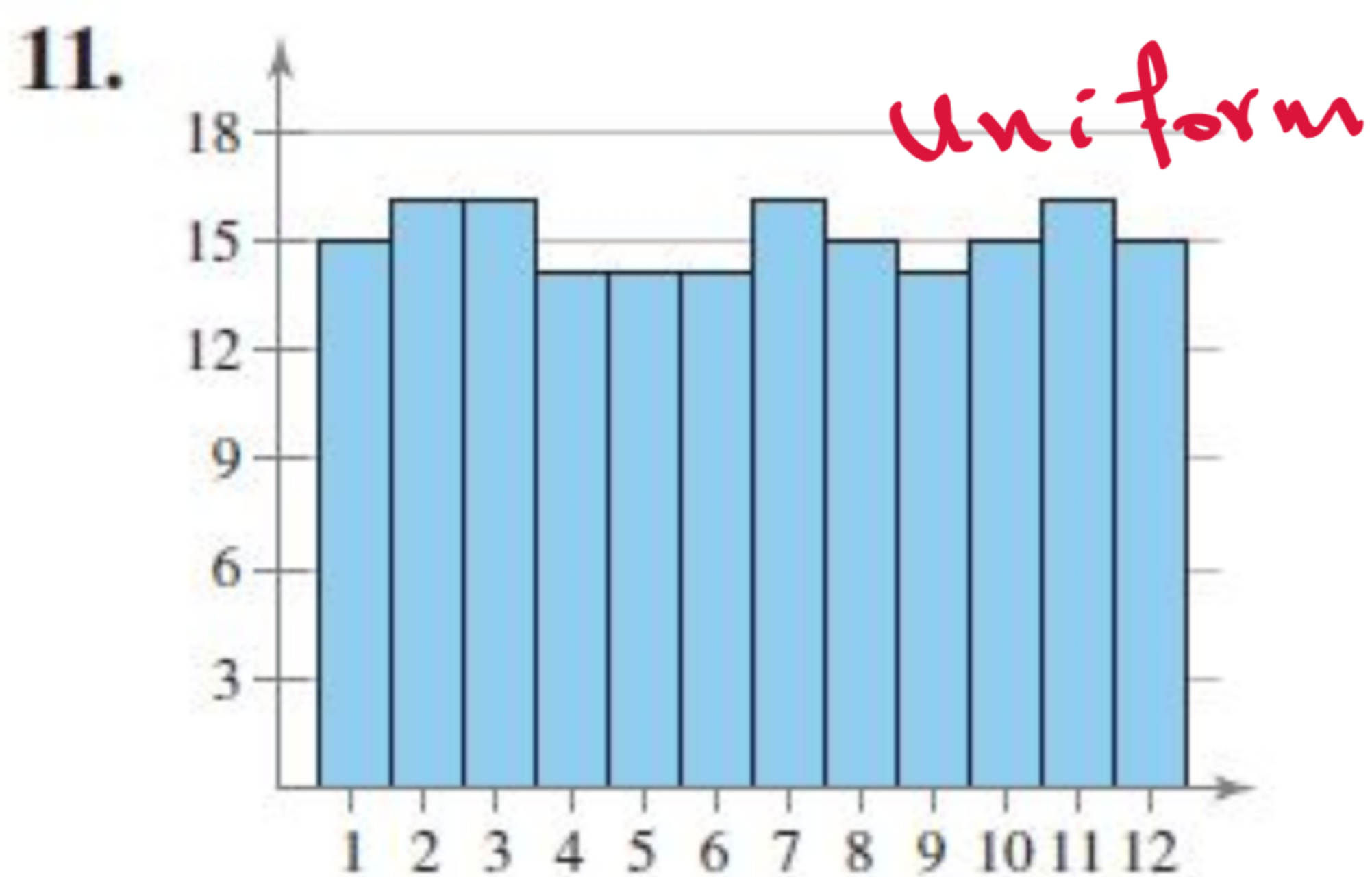
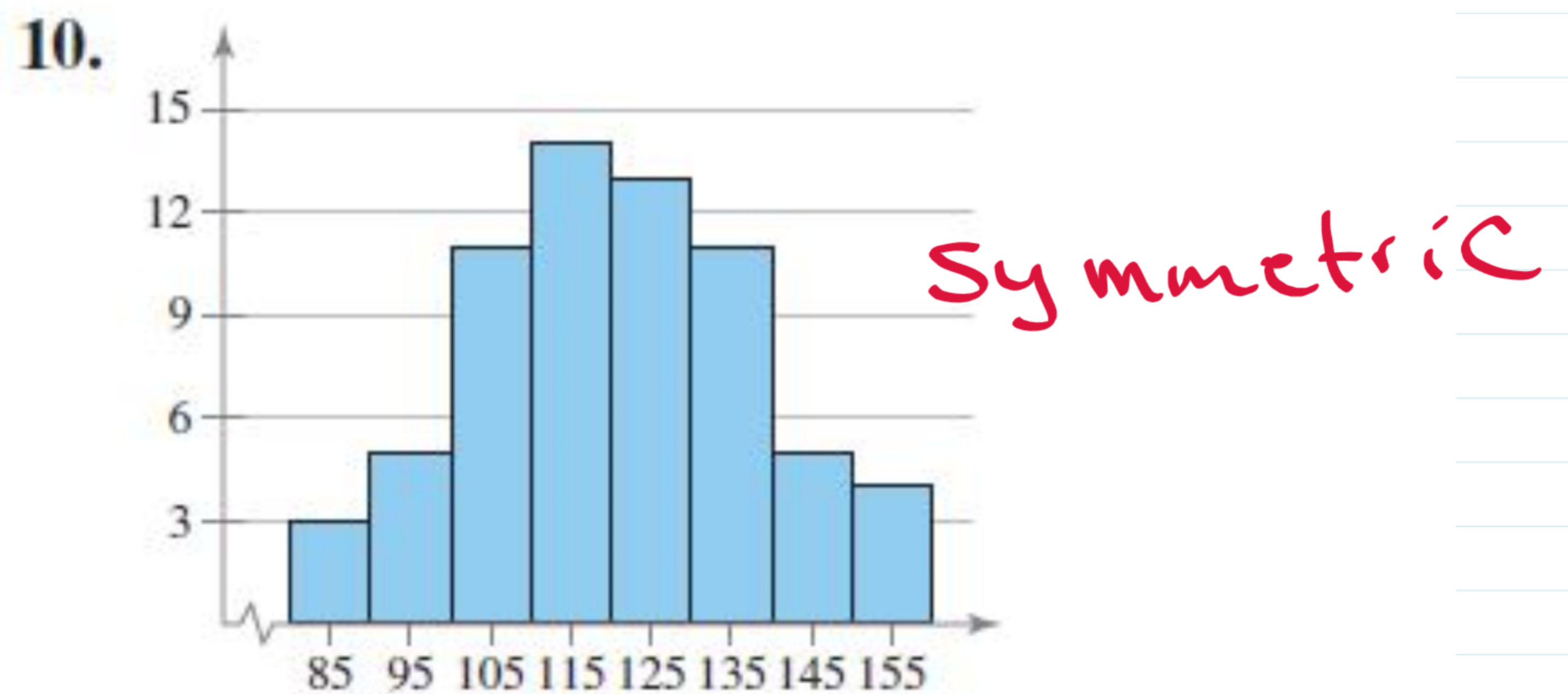
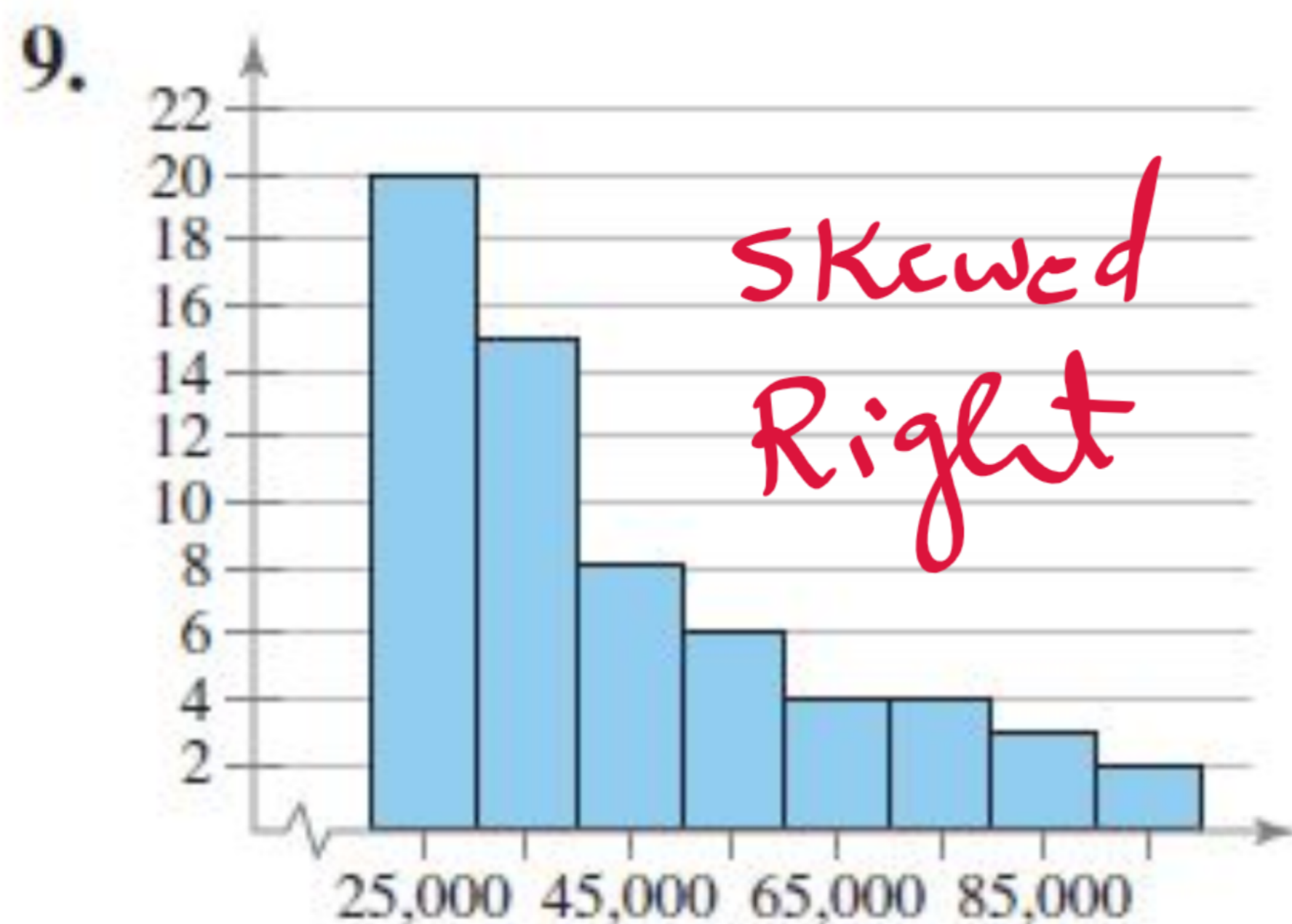
- **Exercices (1,2,3,4) page 72.**
- **Exercices (9,10,11,12) page 72.**
- **Exercices (17,18,19,20,21,22) page 73.**
- **Exercices (31,32,35,36) page 74.**
- **Exercices (51,54) pages 76-77.**

True or False? In Exercises 1–4, determine whether the statement is true or false. If it is false, rewrite it as a true statement.

1. The mean is the measure of central tendency most likely to be affected by an outlier. *True*
2. Some quantitative data sets do not have medians. *False* ^{mode}
3. A data set can have the same mean, median, and mode. *True*
4. When each data class has the same frequency, the distribution is symmetric. *True*



Graphical Analysis In Exercises 9–12, determine whether the approximate shape of the distribution in the histogram is symmetric, uniform, skewed left, skewed right, or none of these. Justify your answer.



9. **Skewed Right** (Bars have a tail to the right)

10. **Symmetric** [when a vertical line is drawn to middle halves are approximately mirrored images].

11. **uniform** [Bars are approximately same height].

12. **Skewed left** [Bars have a tail to the left].

Finding and Discussing the Mean, Median, and Mode In Exercises 17–34, find the mean, median, and mode of the data, if possible. If any of these measures cannot be found or a measure does not represent the center of the data, explain why.

17. Concert Tickets The number of concert tickets purchased online for the last 13 purchases

~~4~~ ~~2~~ ~~5~~ 8 6 6 ~~4~~ ~~3~~ ~~2~~ ~~4~~ 7 8 ~~5~~

$$* \text{ Mean} = \bar{x} = \frac{\sum x}{n} = \frac{4 + 2 + 5 + 8 + 6 + \dots + 5}{13} = \boxed{4.9}$$

$$* \text{ Median} = \boxed{5} \quad \cancel{2} \cancel{2} \cancel{3} \cancel{4} \cancel{4} \cancel{4} \textcircled{5} \cancel{5} \cancel{6} \cancel{6} \cancel{7} \cancel{8} \cancel{8}$$

$$* \text{ Mode} = \boxed{4}$$

18. Tuition The 2009–2010 tuition and fees (in thousands of dollars) for the top 10 liberal arts colleges (Source: *U.S. News and World Report*)

39 39 38 51 38 40 37 40 35 39

$$* \text{ Mean} = \frac{39 + 39 + 38 + \dots + 39}{10} = \boxed{39.6}$$

$$* \text{ Median} = \boxed{39} \quad \cancel{35} \cancel{37} \cancel{38} \cancel{38} \quad 39 \quad 39 \quad \cancel{39} \quad \cancel{46} \quad \cancel{46} \quad \cancel{51}$$

$$* \text{ Mode} = \boxed{39}$$

19. MCAT Scores The average medical college admission test (MCAT) scores for a sample of seven medical schools (Source: Association of American Medical Colleges)

11.0 11.7 10.3 11.7 11.7 10.7 9.7

$$* \text{ Mean} = \frac{\sum X}{n} = \boxed{10.97}$$

$$* \text{ Median} \quad \boxed{11} \quad \cancel{9.7} \quad \cancel{10.3} \quad \cancel{10.7} \quad 11 \quad \cancel{11.7} \quad \cancel{11.7} \quad \cancel{11.7}$$

* Mode: $\boxed{11.7}$ [doesn't represent center of data because it's the largest value].

20. Cholesterol The cholesterol levels of a sample of 10 female employees

154 240 171 188 235 203 184 173 181 275

$$* \text{ Mean} = \frac{\sum X}{n} = \frac{154 + \dots + 275}{10} = \boxed{200.4}$$

$$* \text{ Median} = \frac{184 + 188}{2} = \boxed{186}$$

$\cancel{154} \quad \cancel{171} \quad \cancel{173} \quad \cancel{181} \quad \boxed{184 \quad 188} \quad \cancel{203} \quad \cancel{235} \quad \cancel{240} \quad \cancel{275}$

* Mode: No [Because No entry is Repeated]

21. NFL The average points per game scored by each NFL team during the 2009 regular season (Source: National Football League)

20.4	19.7	17.5	26.7	22.7	21.8	16.6	29.4
26.0	22.5	28.8	19.1	18.1	12.3	16.4	15.2
16.1	23.4	20.6	18.4	23.0	25.1	26.8	31.9
24.4	28.4	20.4	22.1	15.3	10.9	24.2	22.6

10.9	12.3	15.2	15.3	16.1	16.4	16.6	17.5
18.1	18.4	19.1	19.7	20.4	20.4	20.6	21.8
22.1	22.5	22.6	22.7	23	23.4	24.2	24.4
25.1	26	26.7	26.8	28.4	28.8	29.4	31.9

$$* \text{ Mean} = \frac{\sum x}{n} = 21.46$$

$$* \text{ Median} = 21.95$$

$$\rightarrow \text{ Mode} = 20.4$$

22. Power Failures The durations (in minutes) of power failures at a residence in the last 10 years

18 26 45 75 125 80 33 40 44 49
89 80 96 125 12 61 31 63 103 28

12 18 26 28 31 33 40 44 45 49

61 63 75 80 80 89 96 103 125 125

$$* \text{ Median} = \frac{\sum X}{n} = \frac{12 + \dots + 125}{20} = 61.15$$

$$* \text{ Median} = 55$$

$$* \text{ Mode} = 80, 125$$

31. Weights (in pounds) of Carry-On Luggage on a Plane

0	6 7	Key: 3 2 = 32
1	2 5 8 9	
2	0 4 4 4 5 8 9	
3	2 2 3 5 5 5 6 8 9	
4	0 1 2 7 8	
5	1	

32. Grade Point Averages of Students in a Class

0	8	Key: 0 8 = 0.8
1	5 6 8	
2	1 3 4 5	
3	0 9	
4	0 0	

(31) 6 7 12 15 18 19 20 24 24 24
 25 28 29 32 32 33 35 35 35 36
 38 39 40 41 42 47 48 51

* Mean = $\frac{\sum X}{n} = 29.82$

* Median = 32

* Mode = 24, 35

(32) 0.8 1.5 1.6 1.8 2.1 2.3
 2.4 2.5 3.0 3.9 4.0 4.0

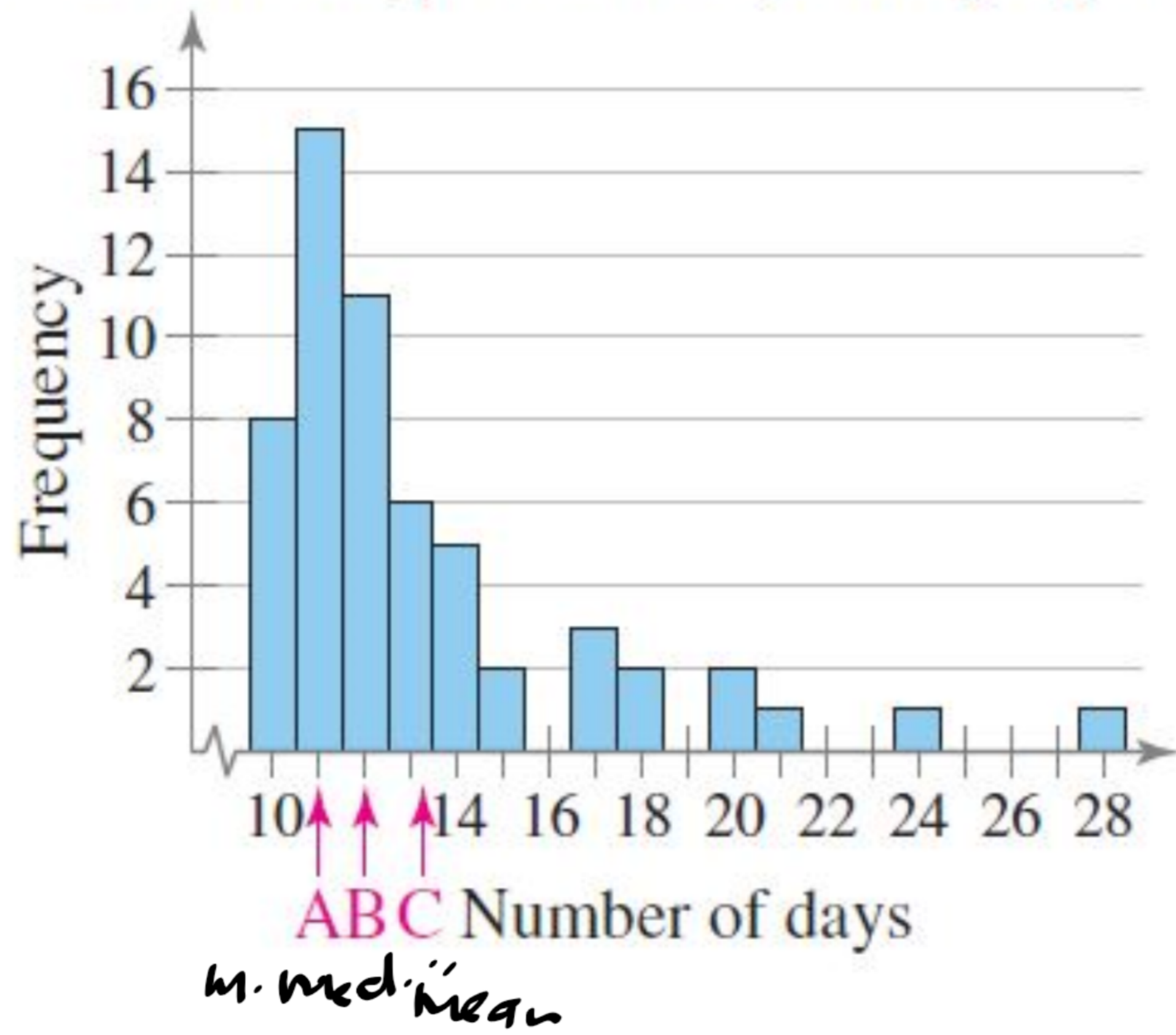
* Mean = 2.5

* Median = $\frac{2.3 + 2.4}{2} = 2.35$

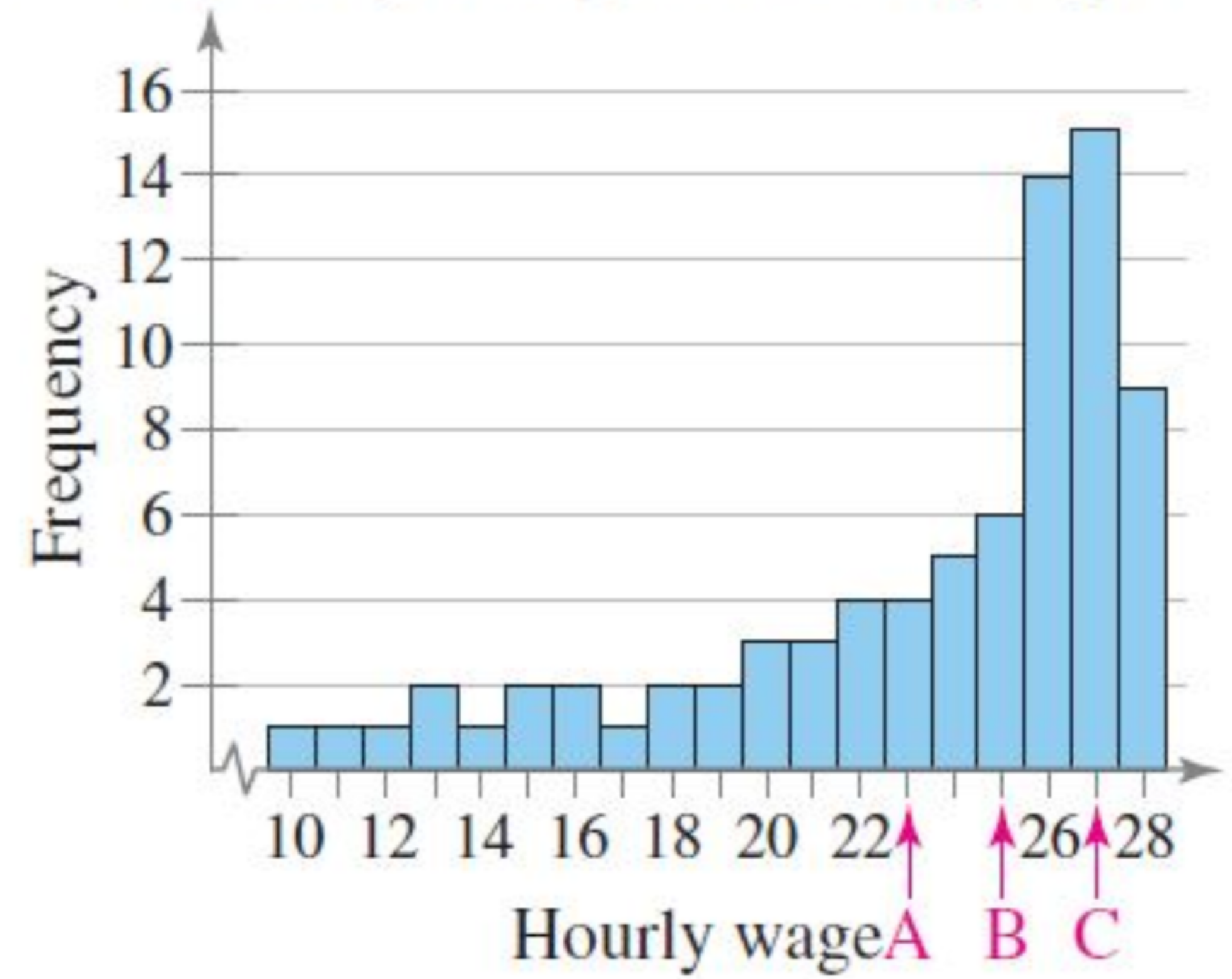
* Mode = 4.0

Graphical Analysis In Exercises 35 and 36, the letters A, B, and C are marked on the horizontal axis. Describe the shape of the data. Then determine which is the mean, which is the median, and which is the mode. Justify your answers.

35. Sick Days Used by Employees



36. Hourly Wages of Employees



① Skewed Right

② A .. mode (Most occurred data entry)

B... Median (Because it's left to mean in skewed right distribution)

C... Mean [Because it's right to median in skewed right distribution)

① Skewed Left

A ... Mean [Because it's left to median in skewed left distribution)

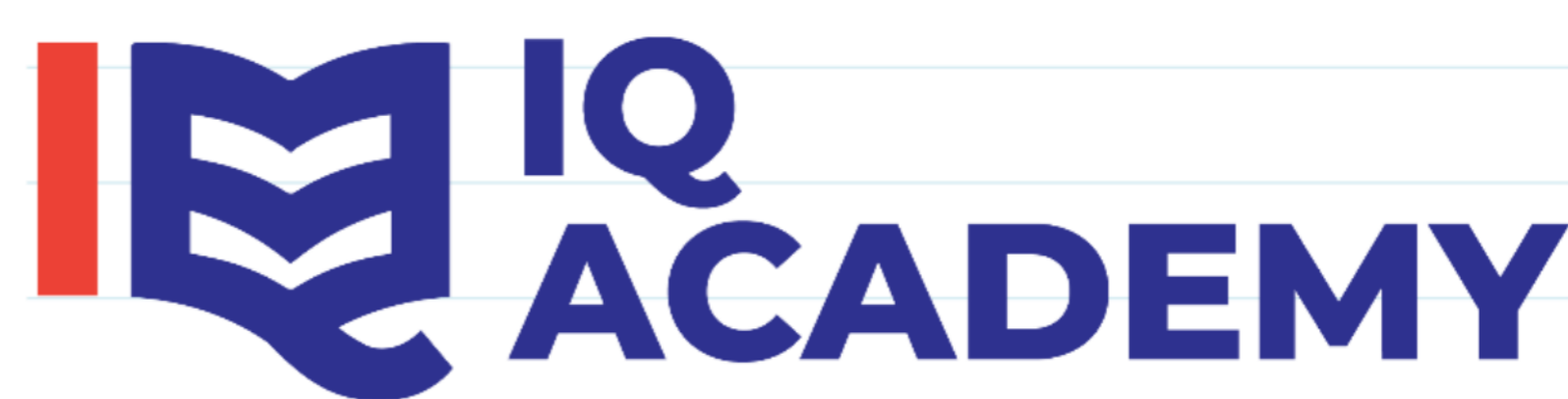
B... Median (Because it's right to mean in skewed left distribution)

C .. mode (Most occurred data entry)

Finding the Mean of Grouped Data In Exercises 49–52, approximate the mean of the grouped data.

51. Ages The ages of residents of a town

Age	Frequency
0–9	55
10–19	70
20–29	35
30–39	56
40–49	74
50–59	42
60–69	38
70–79	17
80–89	10



x	f	$x \cdot f$
4.5	55	247.5
14.5	70	1015
24.5	35	857.5
34.5	56	1932
44.5	74	3293
54.5	42	2289
64.5	38	2451
74.5	17	1266.5
84.5	10	845
Total	397	14196.5

$$\bar{x} = \frac{\sum x \cdot f}{\sum f} = \frac{14196.5}{397} = 35.759$$

Identifying the Shape of a Distribution In Exercises 53–56, construct a frequency distribution and a frequency histogram of the data using the indicated number of classes. Describe the shape of the histogram as symmetric, uniform, negatively skewed, positively skewed, or none of these.

54. Hospitalization

Number of classes: 6

Data set: The number of days 20 patients remained hospitalized

6 9 7 14 4 5 6 8 4 11
10 6 8 6 5 7 6 6 3 11

$$R = \text{max} - \text{min} \\ = 14 - 3 = 11$$

$$W = \frac{R}{k} = \frac{11}{6} = 1.83 \approx 2$$

Class	f	True Class
3-4	3	2.5 - 4.5
5-6	8	4.5 - 6.5
7-8	4	6.5 - 8.5
9-10	2	8.5 - 10.5
11-12	2	10.5 - 12.5
13-14	1	12.5 - 14.5

