

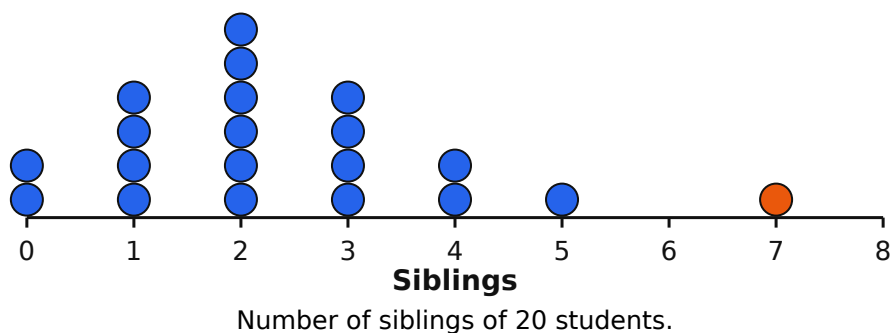
# AP Statistics - Graphs of Quantitative Data and Shape - Answer Key

Common Core AP STAT 1.4, AP STAT 1.5, HSS-ID.A.1, HSS-ID.A.3 · [maths-pdf.fr/en/](https://maths-pdf.fr/en/)

Each answer shows the counting or the reading of the graph, followed by a context sentence where one is needed. Check totals against the sample size before moving on.

**AP Statistics** · Common Core State Standards: **AP STAT 1.4, AP STAT 1.5, HSS-ID.A.1, HSS-ID.A.3**

## Exercise 1 - Read a dotplot



(a) 6 students.

(b)  $2+1+1=4$ .

(c)  $2+4=6$  students, and  $\frac{6}{20}=30\%$ .

**6; 4; 30%.**

## Exercise 2 - Unusual feature

The value 7 is separated from the rest by a gap of  $7-5=2$  siblings, and it is well above the other values (0 to 5).

**It is a potential outlier, separated by a gap. It should be mentioned in a description, and checked for a data-entry error.**

### Exercise 3 - Build a stemplot

Use tens digits as stems (4 through 8) and ones digits as leaves, in order.

```
4 | 8
5 | 2 5
6 | 1 3 3 7
7 | 0 2 4 5 9
8 | 3
```

Key: 6|3 = 63 bpm

Resting heart rates (beats per minute).

**Smallest 48, largest 83, with most values in the 60s and 70s.**

### Exercise 4 - Read a histogram

(a)  $4+9+14=27$ .

(b)  $3+2=5$  students, and  $\frac{5}{40}=12.5\%$ .

(c) The tallest bar is 20 to under 30 minutes, with 14 students.

**27 students; 12.5%; the 20-30 interval.**

### Exercise 5 - Why do the bars touch?

A histogram displays a quantitative variable. Its horizontal axis is a number line, so each interval runs directly into the next one. Gaps would suggest missing values.

**Bars touch because the intervals are continuous on a numerical scale.**

### Exercise 6 - Name the shape

The bars rise to the right and the tail is toward the low scores.

**Skewed left, unimodal, with the peak at the highest interval.**

### Exercise 7 - Frequency table from data

Tally each value into its interval.

| Interval       | Frequency |
|----------------|-----------|
| 10 to under 20 | 1         |
| 20 to under 30 | 7         |
| 30 to under 40 | 7         |
| 40 to under 50 | 3         |
| 50 to under 60 | 2         |

Total:  $1+7+7+3+2=20$ .

**1, 7, 7, 3, 2.**

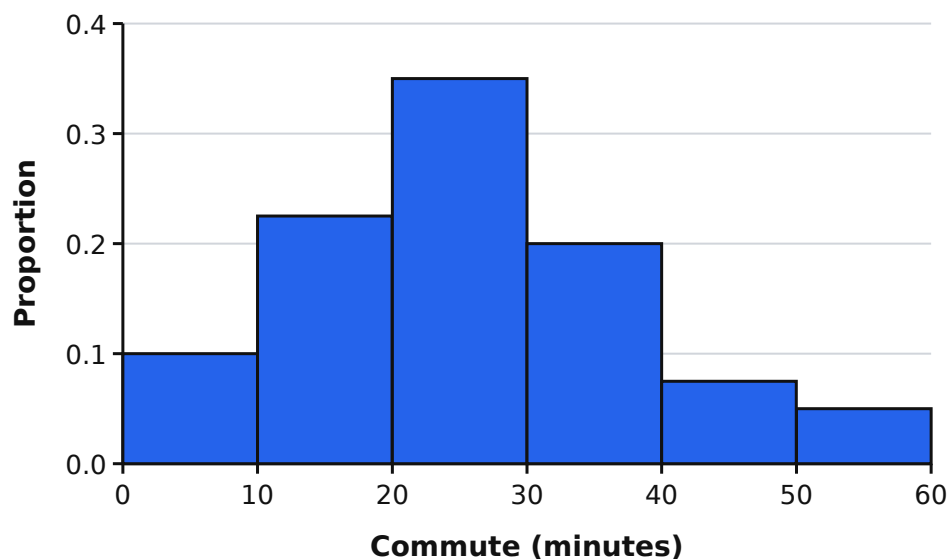
### Exercise 8 - Bimodal

There are two clear peaks, so the distribution is bimodal.

**Bimodal; probably two groups with different typical heights (girls and boys) are mixed in one data set.**

### Exercise 9 - Relative frequency

Divide each count by 40: 0.100, 0.225, 0.350, 0.200, 0.075, 0.050.



Relative frequency version of the commute histogram.

Dividing every count by the same number rescales the vertical axis only.

**0.100, 0.225, 0.350, 0.200, 0.075, 0.050; the shape is unchanged.**

### Exercise 10 - Read a stemplot

(a) 48 bpm.

(b) The 7 row has leaves 0, 2, 4, 5, 9, so 5 athletes.

(c)  $83 - 48 = 35$  bpm.

**48 bpm; 5 athletes; range 35 bpm.**

### Exercise 11 - Bin width

With 50-point intervals the scores fall into only about 2 bars, which hides peaks, gaps, and skew.

**The 50-point version hides the shape; 5- or 10-point intervals show it.**

### Exercise 12 - Center and spread

The tallest bar is 20 to 30 minutes, and the 20th and 21st students lie in that bar ( $4+9=13$  students are below 20,  $13+14=27$  are below 30), so the median is about 25 minutes. Times run from 0 to 60 minutes.

**Center about 25 minutes; spread from 0 to 60 minutes (range about 60).**

### Exercise 13 - Describe in context

Order: 2.1, 2.5, 2.8, 2.9, 3.0, 3.1, 3.3, 3.4, 3.6, 3.8, 4.0, 9.6. Median:  $\frac{3.1+3.3}{2} = 3.2$  inches.

**Skewed right with a clear outlier at 9.6 inches; the center is about 3.2 inches and the other values range from 2.1 to 4.0 inches.**

### Exercise 14 - Backpack weights

The dots cluster near 52 and trail off evenly on both sides, so the distribution is roughly symmetric and unimodal.

More than 54: 55, 56, 58, 60, which is 4 backpacks.

**Roughly symmetric with a peak at 52; 4 backpacks.**

### Exercise 15 - Compare two shapes

Class A: most scores from 55 to 70, with 95 far above the rest (right tail, outlier). Class B: 58 to 74 with no unusual values and a roughly symmetric pattern.

**Class A is skewed right with an outlier at 95 and a range of 40; Class B is roughly symmetric with a range of 16.**

### Exercise 16 - Interpret a percent

$0.18 \times 250 = 45$  workers.

Less than \$14:  $0.07 + 0.15 + 0.18 = 0.40$ .

**45 workers; 40% earn less than \$14.**

### Exercise 17 - Choosing a graph

A dotplot shows every value and works for small sets; with 600 values the dots would overlap and a histogram is clearer.

**Dotplot for the 12 percentages, histogram for the 600 times.**

### Exercise 18 - Flight delays

(a) One peak at 10 to 15 with a slight tail to the right.

(b)  $10 + 5 + 1 = 16$  flights,  $\frac{16}{35} \approx 0.457$ .

(c) The 18th value:  $2 + 6 = 8$ ,  $8 + 11 = 19$ , so the 18th value is in 10 to 15.

**Roughly symmetric, slightly right-skewed; 16/35 (about 45.7%); median in 10 to 15 minutes.**

### **Exercise 19 - Change in data**

After correction, the Class A scores are 55, 60, 62, 64, 65, 65, 65, 66, 68, 70. The maximum is 70.

Range:  $70 - 55 = 15$ .

**The outlier disappears, the shape becomes roughly symmetric, and the range drops from 40 to 15.**

### **Exercise 20 - Quartile position**

The 7th of 13 ordered values is 67, so the median is 67 bpm.

Below 65: 48, 52, 55, 61, 63, 63, which is 6 athletes, and  $\frac{6}{13} \approx 46.2\%$ .

**Median 67 bpm; about 46.2% are below 65 bpm.**