Learning Plan 10

Chapter 16

Question 1

Year	Population (in billions)
2010	6.4
2030	8.7
2050	9.3
2070	9.8
2090	10.0
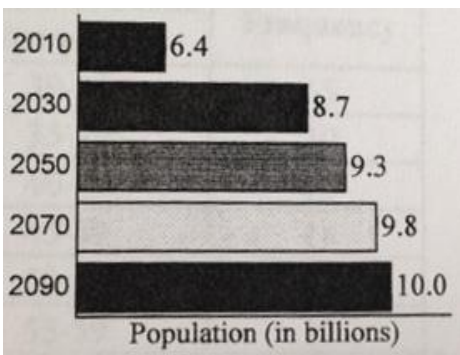
Estimate the population of the country in 2040.

Solution

$$\frac{8.7 + 9.3}{2} = 9$$

Questions 4 & 7

A college professor had students keep a diary of their social interactions for the week. How many students had at least 30 social interactions for the week?

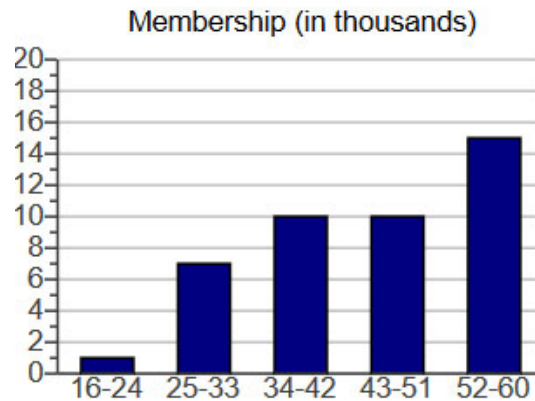| Number of Social Interactions	Frequency
0–4	12
5–9	16
10–14	16
15–19	16
20–24	10
25–29	11
30–34	4
35–39	3
40–44	3
45–49	3

Solution

Add the last four numbers in the Frequency column.

$$4 + 3 + 3 + 3 = 13$$

Question 6

The Toy Train Collectors' Club used the ages of its membership to construct a bar graph. Find the number of members 60 years of age and under.

Membership (in thousands)

Solution

Add the number of members in each age group.

$$1000 + 7000 + 10000 + 10000 + 15000 = 43000$$

Question 8

During one semester of school, Sara Baker spent $4400 on expenses. She spent $1320 of that $4400, or 30%, on rent. On a circle graph of Sara's expenses, how many degrees must represent rent?

Solution

$$30\% = 0.3$$
$$0.3 \cdot 360 = 108$$

Question 9

During one recent period Angela, a student, had $2700 in expenses, as shown in the following table. Find the missing numbers in the table.

Item	Dollar Amount	Percent of Total	Degrees of a Circle
Lodging	$945		

Solution

Percent of the Total:
$$945 \div 2700 = 0.35 = 35\%$$

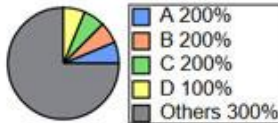Degrees of a Circle:
$$0.35 \cdot 360° = 126°$$

Question 10

Draw a circle graph for the information in the table to the right. The data in the table represents the annual sales (in millions of dollars) of the leading chocolate brands.
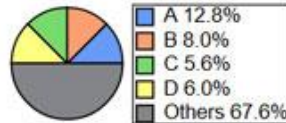
Company	Sales ($ millions)
A	200
B	200
C	200
D	100
All others	300

Choose the correct pie chart below.

○ A.

- A 200%
- B 200%
- C 200%
- D 100%
- Others 300%

○ B.

- A 12.8%
- B 8.0%
- C 5.6%
- D 6.0%
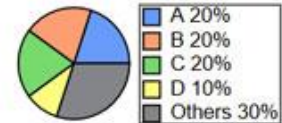- Others 67.6%

★ C.

- A 20%
- B 20%
- C 20%
- D 10%
- Others 30%

The Mean

The mean is the sum of the data items divided by the number of items.

$$\text{Mean} = \frac{\sum x}{n},$$

where $\sum x$ represents the sum of all the data items and n represents the number of items.

Questions 11, 12

Find the mean for the group of data items.

$$91, 95, 99, 97, 93, 95$$

Solution

$$\frac{91 + 95 + 99 + 97 + 93 + 95}{6} = \frac{570}{6} = 95$$

Questions 13, 14, 20

The chart shows the quiz scores. Find the weighed mean.

Quiz Scores	Frequency
5	4
10	5
11	3
13	2

Solution

The total number of quizzes:

$$4 + 5 + 3 + 2 = 14$$

The Weighted Mean:

$$\frac{5 \cdot 4 + 10 \cdot 5 + 11 \cdot 3 + 13 \cdot 2}{14} = 9.21428571 \approx 9.2$$

Question 15

Find the median for the group of numbers.

$$12, 14, 25, 10, 25, 15, 11$$

Solution

First arrange the numbers from smallest to largest.

$$10, 11, 12, 14, 15, 25, 25$$

The middle number is 14.

Question 16

Find the median for the group of numbers.

$$91, 95, 99, 97, 93, 95$$

Solution

First arrange the numbers from smallest to largest.

$$91, 93, 95, 95, 97, 99$$

The number of numbers is even, so the median is the mean of the two middle numbers.

$$\text{Median} = \frac{95 + 95}{2} = 95$$

Question 17
Find the mode for the group of numbers.

$$13, 15, 26, 11, 26, 16, 12$$

Solution

The number that repeats the most is 26.

Question 18

Find the mode for the group of numbers.

$$70, 72, 70, 78, 72, 67, 74$$

Solution

The modes are 70, 72, because these two numbers repeat the most.

Question 19

An individual opened his first kiosk selling candles and other gifts in a nearby mall on February 1. In June, he opened a second kiosk selling the same gifts. Sales at the two kiosks (stores) are shown in thousands of dollars.

	Feb.	Mar.	Apr.	May	June	July	Aug	Sept.	Oct.
Store 1	6.2	6.4	6.8	6.7	7.5	7.8	8.1	7.7	8.4
Store 2	—	—	—	—	8.2	6.1	8.2	8.7	9.6

1. Find the median, mean, and mode sales for each store to the nearest tenth.
2. Plot sales for both stores on the same line graph, with month on the horizontal axis and sales on the vertical axis.
3. What trends are apparent from the preceding line graph?

Solution

Mean for store 1:

$$\frac{6.2+6.4+6.8+6.7+7.5+7.8+8.1+7.7+8.4}{9}$$

$$= \frac{65.5}{9} = 7.28888\ldots \approx \boxed{7.3}$$

Mean for store 2:

$$\frac{8.2+6.1+8.2+8.7+9.6}{5} = \frac{40.8}{5} = 8.16 \approx \boxed{8.2}$$

Median for store 1:

Arrange the numbers from smallest to largest:

6.2   6.4   6.7   6.8   ⑦.5   7.7   7.8   8.1   8.4
↗
median

Median for store 2:

6.1   8.2   ⑧.2   8.7   9.6
↗
median

Mode:

Store 1 has no mode.
Store 2 has mode 8.2.

Question 20

20.   Find the weighted mean for the following data.

Value	Frequency
110	9
114	14
120	15
123	10
129	19
132	9
140	5

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The weighted mean is equal to 122.9.

(Round to the nearest tenth as needed.)

$$\frac{110 \cdot 9 + 114 \cdot 14 + 120 \cdot 15 + 123 \cdot 10 + 129 \cdot 19 + 132 \cdot 9 + 140 \cdot 5}{9 + 14 + 15 + 10 + 19 + 9 + 5}$$

$$= \frac{9955}{81} = 122.9012346\ldots$$

$$\approx \boxed{122.9}$$