

**EXERCISE 14.1**

Write the correct answer in each of the following:

1. The class mark of the class 90-120 is:

- (A) 90
- (B) 105
- (C) 115
- (D) 120

**Solution:**

(B) 105

Explanation:

Class mark = (upper limit + lower limit) / 2

Then,

$$\begin{aligned}\text{Class mark} &= 120 + 90 / 2 \\ &= 210 / 2 \\ &= 105.\end{aligned}$$

Hence, option (B) is the correct answer.

2. The range of the data:

25, 18, 20, 22, 16, 6, 17, 15, 12, 30, 32, 10, 19, 8, 11, 20 is

- (A) 10
- (B) 15
- (C) 18
- (D) 26

**Solution:**

(D) 26

Explanation:

According to the question,

The minimum and maximum values of given data are 6 and 32 respectively.

Hence,

$$\begin{aligned}\text{Range of the data} &= 32 - 6 \\ &= 26\end{aligned}$$

Hence, option (D) is the correct answer.

3. In a frequency distribution, the mid value of a class is 10 and the width of the class is 6. The lower limit of the class is:

- (A) 6
- (B) 7
- (C) 8
- (D) 12

**Solution:**

(B) 7

Explanation:

According to the question,

Mid value = 10 cm

Width = 6

We know that,

$$\begin{aligned} \text{Lower Limit} &= \text{mid value of class} - (\text{width}/2) \\ &= 10 - (6/2) \\ &= 10 - 3 \\ &= 7 \end{aligned}$$

Hence, option (B) is the correct answer.

**4. The width of each of five continuous classes in a frequency distribution is 5 and the lower class-limit of the lowest class is 10. The upper class-limit of the highest class is:**

- (A) 15
- (B) 25
- (C) 35
- (D) 40

**Solution:**

**(C) 35**

Explanation:

According to the question,

Since width of each five consecutive classes = 5

And, the lower limit of lowest class = 10

We get the data as follows,

10-15

15-20

20-25

25-30

30-35

Hence, we get upper limit of highest class = 35

Hence, option (C) is the correct answer.

**5. Let  $m$  be the mid-point and  $l$  be the upper class limit of a class in a continuous frequency distribution. The lower class limit of the class is:**

- (A)  $2m + l$
- (B)  $2m - l$
- (C)  $m - l$
- (D)  $m - 2l$

**Solution:**

**(B)  $2m - l$**

Explanation:

Let  $x$  be the lower class limit of a continuous frequency distribution

Let  $y$  be the upper class limit of a continuous frequency distribution

Now, according to the question,

$$\begin{aligned} \text{Mid-point of a class} &= (x+y) / 2 \\ &= m \end{aligned}$$

$$x+y = 2m \text{ or, } x+l=2m$$

It is given that,  $y = l =$  upper class limit

$$x=2m-l$$

Hence, the lower class limit of the class =  $2m-1$

Hence, option (B) is the correct answer.

**6. The class marks of a frequency distribution are given as follows:**

**15, 20, 25, ...**

**The class corresponding to the class mark 20 is:**

**(A) 12.5 – 17.5**

**(B) 17.5 – 22.5**

**(C) 18.5 – 21.5**

**(D) 19.5 – 20.5**

**Solution:**

**(B) 17.5 – 22.5**

Explanation:

According to the question,

Difference between class marks = 5

The classes for these class marks are as follows:

2.5 - 7.5

7.5 - 12.5

12.5 - 17.5

17.5 - 22.5

22.5 - 27.5

Hence, the class corresponding to class mark 20 = 17.5 – 22.5

Hence, option (B) is the correct answer.

**7. In the class intervals 10-20, 20-30, the number 20 is included in:**

**(A) 10-20**

**(B) 20-30**

**(C) both the intervals**

**(D) none of these intervals**

**Solution:**

**(B) 20-30**

Explanation:

20 belongs to the group 20-30.

Hence, option (B) is the correct answer.

**8. A grouped frequency table with class intervals of equal sizes using 250-270 (270 not included in this interval) as one of the class interval is constructed for the following data :**

**268, 220, 368, 258, 242, 310, 272, 342,**

**310, 290, 300, 320, 319, 304, 402, 318,**

**406, 292, 354, 278, 210, 240, 330, 316,**

**406, 215, 258, 236.**

**The frequency of the class 310-330 is:**

**(A) 4**

**(B) 5**

**(C) 6**

**(D) 7**

**Solution:**

**(C) 6**

Explanation:

Arranging the following data in a table, we get,

Class Interval	Frequency
210 – 230	3
230 – 250	3
250 – 270	3
270 – 290	2
290 – 310	4
310 – 330	6
330 – 350	2
350 – 370	2
370 – 390	0
390 – 410	3

Therefore, we get from the above table,

The frequency of the class 310-330 is = 6

Hence, option (C) is the correct answer.

**9. A grouped frequency distribution table with classes of equal sizes using 63-72 (72 included) as one of the class is constructed for the following data:**

**30, 32, 45, 54, 74, 78, 108, 112, 66, 76, 88,**

**40, 14, 20, 15, 35, 44, 66, 75, 84, 95, 96,**

**102, 110, 88, 74, 112, 14, 34, 44.**

**The number of classes in the distribution will be :**

**(A) 9**

**(B) 10**

**(C) 11**

**(D) 12**

**Solution:**

**(B) 10**

Explanation:

According to the question,

The given frequency varies from 14 to 112.

So the class intervals are as follows:

13-22, 23-32, 33-42, 43-52, 53-62, 63-72, 73-82, 83-92, 93-102, 103-112.

Number of class interval = 10.

Hence, option (B) is the correct answer.

10. To draw a histogram to represent the following frequency distribution:

Class interval	5-10	10-15	15-25	25-45	45-75
Frequency	6	12	10	8	15

the adjusted frequency for the class 25-45 is :

(A) 6

(B) 5

(C) 3

(D) 2

Solution:

(D) 2

Explanation:

Adjusted frequency of a class is given by,

(Minimum class size of frequency distribution  $\times$  Frequency of given class) / Class size of given class

Therefore,

Adjusted frequency for the class 25 - 45 =  $(5 \times 8) / 20 = 2$

Hence, option (D) is the correct answer.

11. The mean of five numbers is 30. If one number is excluded, their mean becomes 28. The excluded number is:

(A) 28

(B) 30

(C) 35

(D) 38

Solution:

(D) 38

Explanation:

Let a,b,c,d and e are five numbers

Average of a data = sum of total observations / total number of observations

According to the question,

Mean = 30

$(a + b + c + d + e) / 5 = 30$

$\Rightarrow (a + b + c + d + e) = 150 \quad \dots(1)$

Let the number excluded be a

Then,

New mean =  $(b + c + d + e) / 4 = 28$

$\Rightarrow (b + c + d + e) = 112$

Substituting this in equation (1),

$\Rightarrow a + 112 = 150$

$$\Rightarrow a = 150 - 112 \\ = 38$$

Therefore, excluded number = 38

Hence, option (D) is the correct answer.

**12. If the mean of the observations:**

**$x, x + 3, x + 5, x + 7, x + 10$**

**is 9, the mean of the last three observations is**

- (A)  $10\frac{1}{3}$       (B)  $10\frac{2}{3}$       (C)  $11\frac{1}{3}$       (D)  $11\frac{2}{3}$

**Solution:**

(C)

$$11\frac{1}{3}$$

Explanation:

We know that,

Average of a data = sum of total observations / total number of observations

According to the question

$$(x + x+3 + x+5 + x+7 + x+10)/5 = 9$$

$$(5x + 15)/5 = 9x + 3 = 9$$

$$x = 6$$

Now, the terms become

$$6, 6 + 3, 6 + 5, 6 + 7, 6 + 10 = 6, 9, 11, 13, 16$$

$$\text{So, the mean of the last three observations} = (11 + 13 + 16)/3 \\ = 40/3$$

$$= 11\frac{1}{3}$$

Hence, option (C) is the correct answer.