

Class: 9

Subject: Mathematics

Topic: ASK15E9UT05

No. of Questions: 30

Q1. Tickets numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn has a number which is a multiple of 3 or 5?

- (a) $\frac{1}{2}$
- (b) $\frac{2}{5}$
- (c) $\frac{8}{15}$
- (d) $\frac{9}{20}$

Sol. (d)

Here, $S = \{1, 2, 3, 4, \dots, 19, 20\}$.

Let = event of getting a multiples of 3 or 5 = $\{3, 6, 9, 12, 15, 18, 5, 10, 20\}$.

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{9}{20}.$$

Q2. In a box, there are 8 red, 7 blue and 6 green balls. One ball is picked up randomly. What is the probability that it is neither red nor green?

- (a) $\frac{1}{3}$
- (b) $\frac{3}{4}$
- (c) $\frac{7}{19}$
- (d) $\frac{8}{21}$
- (e) $\frac{9}{21}$

Sol. (a)

Total number of balls = $(8 + 7 + 6) = 21$.

Let E = event that the ball draw is neither red nor gree

= event that the ball drawn is blue.

$$\therefore n(E) = 7$$

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{7}{21} = \frac{1}{3}.$$

Q3. What is the probability of getting a sum 9 from two throws of a dice?

- (a) $\frac{1}{6}$
- (b) $\frac{1}{8}$
- (c) $\frac{1}{9}$
- (d) $\frac{1}{12}$

Sol. (c)

In two thrown of a die, $n(S) = (6 \times 6) = 36$.

Let E = event of getting a sum = $\{(3, 6), (4, 5), (5, 4), (6, 3)\}$.

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{4}{36} = \frac{1}{9}$$

Q4. Three unbiased coins are tossed. What is the probability of getting at most two heads?

- (a) $\frac{3}{4}$
- (b) $\frac{1}{4}$
- (c) $\frac{3}{8}$
- (d) $\frac{7}{8}$

Sol. (d)

Here $S = \{TTT, TTH, THT, HTT, THH, HTH, HHT, HHH\}$

Let E = event of getting at most two heads.

Then $E = \{TTT, TTH, THT, HTT, THH, HTH, HHT\}$.

$$\therefore p(E) = \frac{n(E)}{n(S)} = \frac{7}{8}$$

Q5. Two dice are tossed. The probability that the total score is a prime number is:

- (a) $\frac{1}{6}$
- (b) $\frac{5}{12}$
- (c) $\frac{1}{2}$
- (d) $\frac{7}{9}$

Sol. (b)

Clearly, $n(S) = (6 \times 6) = 36$.

Let E = Event that the sum is a prime number.

Then $E = \{ (1, 1), (1, 2), (1, 4), (1, 6), (2, 1), (2, 3), (2, 5), (3, 2), (3, 4), (4, 1), (4, 3), (5, 2), (5, 6), (6, 1), (6, 5) \}$

$\therefore n(E) = 15$.

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{15}{36} = \frac{5}{12}$$

Q6. A card is drawn from a pack of 52 cards. The probability of getting a queen of club or a king of heart is:

- (a) $\frac{1}{13}$
- (b) $\frac{2}{13}$
- (c) $\frac{1}{26}$
- (d) $\frac{1}{52}$

Sol. (c)

Here, $n(S) = 52$

Let E = event of getting a queen of club or a king of heart.

Then, $n(E) = 2$.

$$\therefore P(E) = \frac{n(E)}{n(S)} = \frac{2}{52} = \frac{1}{26}$$

Q7. One card is drawn at random from a pack of 52 cards. What is the probability that the card drawn is a face card (Jack, Queen and King only)?

- (a) $\frac{1}{13}$
- (b) $\frac{3}{13}$
- (c) $\frac{1}{4}$

(d) $\frac{9}{52}$

Sol. (b)

Clearly, there are 52 cards, out of which there are 12 face cards.

$$\therefore P(\text{getting a face card}) = \frac{12}{52} = \frac{3}{13}.$$

Q8. A bag contains 6 black and 8 white balls. One ball is drawn at random. What is the probability that the ball drawn is white?

- (a) $\frac{3}{4}$
- (b) $\frac{4}{7}$
- (c) $\frac{1}{8}$
- (d) $\frac{3}{7}$

Sol. (b)

Let number of balls = $(6 + 8) = 14$.

Number of white balls = 8.

$$P(\text{drawing a white ball}) = \frac{8}{14} = \frac{4}{7}.$$

Q9. The mean of 6, 10, x and 12 is 8. Find the value of x.

- (a) 3
- (b) 4
- (c) 5
- (d) 1

Sol. (b)

$$\bar{x} = \frac{\sum_{i=1}^n xi}{n} = \frac{6+10+x+12}{4} = \frac{28+x}{4}$$

$$\Rightarrow 8 = \frac{28+x}{4} \quad \therefore (\bar{x} = 8)$$

$$\Rightarrow 28 + x = 32 \Rightarrow x = 4,$$

\therefore Value of x is 4

Q10. The mean income of a group of persons is Rs. 400. Another group of persons has mean income Rs. 48. If the mean income of all the persons in the two groups together is Rs. 430, then find ratio of the number of persons in the group..

- (a) 3 : 5
- (b) 3 : 7
- (c) 6 : 1
- (d) 5 : 3

Sol. (d)

$$\bar{x} = \frac{n_1\bar{x}_1 + n_2\bar{x}_2 + \dots + n_k\bar{x}_k}{n_1 + n_2} \therefore \bar{x}_1 = 400, \bar{x}_2 = 480, \bar{x} = 430$$

$$\therefore 430 = \frac{n_1(400) + n_2(480)}{n_1 + n_2} \Rightarrow 30n_1 = 50n_2$$

$$\Rightarrow \frac{n_1}{n_2} = \frac{5}{3} \Rightarrow n_1 : n_2 = 5 : 3$$

Hence required ratio = 5 : 3

Q11. The mean of 121 numbers is 59. If each number is multiplied by 4. What will be the new means?

- (a) 234
- (b) 235
- (c) 236
- (d) 237

Sol. (c)

Here $n = 121$, $\bar{x} = 59$.

$$\therefore \text{The sum of 121 numbers} = n\bar{x} = (121 \times 59) = 7139.$$

When each number is multiplied by 4,

$$\text{Total} = 4 \times (\text{previous total}) = 4 \times 7139 = 28556.$$

$$\therefore \text{New mean} = \left(\frac{28556}{121}\right) = 236$$

Q12. In a data, 10 numbers are arranged in ascending order. If the 8th entry is increases by 6, then what will be the change in median?

- (a) Change in the median
- (b) Not change in the median
- (c) There is no result come out
- (d) None of these

Sol. (b)

As the median depends only on 5th and 6th entries and there is no change in these entries therefore there no change in the value of the median.

Q13. The mean of 10 numbers is 20. If 5 is subtracted from every number, what will be the new mean?

- (a) 16
- (b) 13
- (c) 15
- (d) 14

Sol. (c)

Let x_1, x_2, \dots, x_{10} be 10 numbers with their mean equal to 20. Then,

$$\bar{x} = \frac{1}{n} (\sum x_i)$$

$$\Rightarrow 20 = \frac{x_1 + x_2 + \dots + x_{10}}{10}$$

$$\Rightarrow x_1 + x_2 + \dots + x_{10} = 200$$

New numbers are $x_1 - 5, x_2 - 5, \dots, x_{10} - 5$. Let \bar{X}' be the mean of new numbers. Then,

$$\bar{X}' = \frac{(x_1 - 5) + (x_2 - 5) + \dots + (x_{10} - 5)}{10}$$

$$\bar{X}' = \frac{(x_1 + x_2 + \dots + x_{10}) - 5 \times 10}{10} = \frac{200 - 50}{10} \quad \text{[Using (i)]}$$

$$\bar{X}' = 15$$

Q14. In an experiment, the sum of probabilities of different events is

- (a) 1
- (b) 0.5
- (c) -2
- (d) 0

Sol. (a)

Q15. In rolling a dice, the probability of getting number 8 is

- (a) 0
- (b) 1
- (c) -1
- (d) $\frac{1}{2}$

Sol. (a)

Q16. Two dice are rolled simultaneously. Find the probability that they show different faces.

- (a) $\frac{6}{5}$
- (b) $\frac{1}{6}$
- (c) $\frac{1}{3}$
- (d) $\frac{5}{6}$

Sol. (d)

Q17. If the mean of the observations $x, x + 3, x + 5, x + 7$ and $x + 10$ is 9, the mean of the last three observation is

- (a) $10\frac{1}{3}$
- (b) $10\frac{2}{3}$
- (c) $11\frac{1}{3}$
- (d) $11\frac{2}{3}$

Sol. (c)

We know, mean = $\frac{\text{Sum of all the observations}}{\text{Total no. of boservation}}$

$$\Rightarrow \text{Mean} = \frac{x-x+3-x+5-x+7+x-10}{5}$$

$$9 = \frac{5x+25}{5} \Rightarrow x = 4$$

So, mean of last three observation is

$$\frac{3x+22}{3} - \frac{12+22}{3} = \frac{34}{3} = 11\frac{1}{3}$$

Q18. If \bar{x} is the mean of x_1, x_2, \dots, x_n then for $a \neq 0$, the mean of $ax_1, ax_2, \dots, ax_n, \frac{x_1}{a}, \frac{x_2}{a}, \dots, \frac{x_n}{a}$ is

- (a) $(a + \frac{1}{a})\bar{x}$
- (b) $(a + \frac{1}{a})\frac{\bar{x}}{2}$
- (c) $(a + \frac{1}{a})\frac{\bar{x}}{n}$
- (d) $(a + \frac{1}{a})\bar{x}$

Sol. (b)

$$\text{Given } \frac{x_1 + \dots + x_n}{n} = \bar{x} \quad \dots\dots(i)$$

$$\Rightarrow \frac{ax_1 + \dots + ax_n}{an} = \bar{x} \Rightarrow \frac{ax_1 + \dots + ax_n}{n} = a\bar{x} \quad \dots\dots(ii)$$

Also, from (1), we have

$$\frac{\frac{1}{a}x_1 + \dots + \frac{1}{a}x_n}{\frac{1}{a}n} = \bar{x}$$

$$\Rightarrow \frac{\frac{x_1}{a} + \dots + \frac{x_n}{a}}{n} = \frac{\bar{x}}{a}$$

So, the mean of $ax_1, \dots, ax_n, \frac{x_1}{a}, \dots, \frac{x_n}{a}$

$$\text{is } \frac{a\bar{x} - \frac{\bar{x}}{a}}{2} = \frac{\bar{x}}{a} \left(a + \frac{1}{a} \right)$$

Q19. In a morning walk, I came across person A, person B, person C and person D, 11 times, 7 times, 10 times and 5 times respectively. I want to represent this data graphically. Which of the following is the best representation?

- (a) Bar graph
- (b) Histogram with unequal widths
- (c) Histogram with equal widths
- (d) Frequency polygon

Sol. (a)

Q20. Probability of an event can be

- (a) -0.7
- (b) $\frac{11}{9}$
- (c) 1.001
- (d) 0.6

Sol. (d)

Probability of an event always lies between 0 and 1. (both inclusive)

Q21. In a class of 40 students there are 120% boys. Then the number of boys is

- (a) 48
- (b) 24
- (c) 80
- (d) None of these

Sol. (d)

120% is no valid.

Q22. Find the value of p if the mean of the following data is 40.4.

Variable (x)	Frequency (f)
10	3
20	8
30	12
40	5
50	p
60	7
70	5

- (a) 11
- (b) 10
- (c) 12
- (d) 13

Sol. (b)

$$\text{Mean} \frac{\sum f(x)}{\sum f} = \frac{30+160+360+200+420+350+50p}{40+p}$$

$$40.4 = \frac{1520+50p}{40+p} \Rightarrow 9.6p = 96 \Rightarrow p = 10$$

Q23. Find the mean of the factors of 12.

Sol. Factors of 12 are 1, 2, 3, 4, 6, 12

Q24. The mean of the age of three students Reema, Dipanshu and Bhavya is 15 years. If their ages are in the ratio 4 : 5 : 6 respectively, then find their respective ages.

- (a) 12, 15, 18 years
- (b) 15, 12, 18 years
- (c) 18, 12, 15 years
- (d) 12, 18, 15 years

Sol. (a)

Let their ages be $4x$, $5x$ and $6x$.

$$\text{Their mean age} = \frac{4x+5x+6x}{3}$$

$$15 = \frac{15x}{3} \Rightarrow 5x = 15 \Rightarrow x = 3$$

So, their ages are 12, 15, 18 years.

Q25. During rainy season of 90 days, it was observed that it rained on 20 days only. Then the probability that it did not rain on a day is.

- (a) $\frac{5}{9}$
- (b) $\frac{3}{7}$
- (c) $\frac{9}{7}$
- (d) $\frac{7}{9}$

Sol. (d)

$$\frac{7}{9}$$

Q26. A bag contains 12 pencils 3 sharpeners and 7 pens. If we take out one item from the bag at random, probability of drawing a pencil is

- (a) $\frac{6}{12}$
- (b) $\frac{6}{11}$
- (c) $\frac{11}{6}$
- (d) $\frac{7}{11}$

Sol. (b)

$$\frac{6}{11}$$

Q27. Find the mean of thirty numbers where mean of ten numbers is 12 and that of the remaining 20 is 9.

- (a) 9
- (b) 8
- (c) 10
- (d) 7

Sol. (c)

$$\text{Required mean} = \frac{10 \times 12 + 20 \times 9}{30} = \frac{120 + 180}{30} = 10$$

Q28. Mode of the data 15, 14, 19, 20, 14, 15, 16, 14, 15, 18, 14, 19, 20, 15, 17, 15 is

- (a) 14
- (b) 15
- (c) 16
- (d) 17

Sol. (b)

Most occurring observation is 15.

Q29. The range of the data 25, 18, 20, 22, 16, 6, 17, 15, 12, 30, 32, 10, 19, 8, 11, 20 is

- (a) 25
- (b) 24
- (c) 23
- (d) 26

Sol. (d)

Highest data value is 32 and the lowest is 6

$$\begin{aligned}\therefore \text{Range} &= \text{highest value} - \text{lowest value} \\ &= 32 - 6 = 26.\end{aligned}$$

Q30. The following observations are arranged in ascending order:

26, 29, 42, 53, x , $x+2$, 70, 75, 82, 93, If the median is 65, then the value of x is

- (a) 63
- (b) 62
- (c) 64
- (d) 61

Sol. (c)

Since the number of observation is 10 (even)

$$\begin{aligned}\therefore \text{Median} &= \frac{5^{\text{th}} \text{obs} + 6^{\text{th}} \text{obs}}{2} \\ 65 &= \frac{x + x + 2}{2} = \frac{2x + 2}{2} = x + 1\end{aligned}$$

$$\Rightarrow x = 64.$$

askITians