

Average

1- Calculate the total time taken by a bus to cover a distance of 320 km at an average speed of 40 km/h.

$$\frac{320}{40} = 8 \text{ hours}$$

2.5/5

attempt by giving statements and elaborations.

2- Fahad travels for 3 hours at 40 mile/h and then covers a distance of 95 miles in next 2 hours. Find the average

$$40 \times 3 = 120$$

2.5/5

statements?

$$\frac{120 + 95}{3 + 2} = \frac{215}{5} = 43$$

unit?

3- Aslam travels at the speed of 65 km/h for 4 hours, then reaches at the motorway and travels at the speed of 80 km/h for 2 hours. What will be average speed of his car?

$$65 \times 4 = 260$$

$$80 \times 2 = 160$$

$$\text{Average Speed} = \frac{2xy}{x+y}$$

$$= \frac{2 \times 260 \times 160}{260 + 160} = \frac{83200}{420}$$

$$\text{Average Speed} = 198.09$$

OR

$$\text{Average Speed} = \frac{2xy}{x+y} = \frac{2 \times 65 \times 80}{260 + 80} = \frac{10400}{340}$$

$$\text{Average Speed} = 71.72$$

2/5

4- Fatima drives a distance of 300 km at an average speed of 40 km/h, and then returns at an average speed of 60 km/h. What will be her average speed for the entire trip?

$$\text{Average Speed} = \frac{2xy}{x+y} = \frac{2 \times 40 \times 60}{40+60} = \frac{480}{100}$$

$$\text{Average speed} = 48$$

5- If the average of 9.75, 10.25, 8.50 and F is 10, what is the value of F?

$$\bar{x} = \frac{\sum x}{n}$$

$$10 = \frac{9.75 + 10.25 + 8.50 + F}{4}$$

$$\begin{array}{r} 9.75 \\ 10.25 \\ 8.50 \\ \hline 28.50 \end{array}$$

$$40 = 28.5 + F \Rightarrow F = 40 - 28.5$$

$$\begin{array}{r} 40.00 \\ 28.50 \\ \hline 11.50 \end{array}$$

$$F = 11.5$$

6- The average of 5 tests is 46 and that of first 4 is 45. The 5th test is?

$$\bar{x} = \frac{\sum x}{n} \Rightarrow 46 = \frac{45 + 45 + 45 + 45 + x_{5th}}{5}$$

$$45 \times 5 = 180 + x \Rightarrow 230 = 180 + x$$

$$x_{5th} = 230 - 180$$

$$x_{5th} = 50$$

7- Zuhra scored an average 34 runs in 3 matches.
What does she need on her 4th test to raise her
average 36?

$$34 = \frac{\sum x_i}{3} \Rightarrow \sum x_i = 102$$

$$36 = \frac{\sum x_i}{4} \Rightarrow \sum x_i = 144$$

$$144 - 102 = 42$$

She need 42 runs on her 4th test to raise
her average 36.

Probability

1- Two dice are rolled and, find the probability that the sum is a) equal to 1 b) equal to 4, c) less than 13.

$$6^2 = 36$$

$$S = \left\{ \begin{array}{l} (1,1) (1,2) (1,3) (1,4) (1,5) (1,6) \\ (2,1) (2,2) (2,3) (2,4) (2,5) (2,6) \\ (3,1) (3,2) (3,3) (3,4) (3,5) (3,6) \\ (4,1) (4,2) (4,3) (4,4) (4,5) (4,6) \\ (5,1) (5,2) (5,3) (5,4) (5,5) (5,6) \\ (6,1) (6,2) (6,3) (6,4) (6,5) (6,6) \end{array} \right\}$$

narrate the reason as well.

a) equal to 1. = $\cancel{0}/36 = 0$

b) equal to 4 = $\cancel{3}/36 = 1/12$.

c) less than 13. = $1/36$ α

2- A die is rolled and a coin is tossed, find the probability that the die shows an odd number and the coin shows a head.

$$S = \{ H_1, H_2, H_3, H_4, H_5, H_6, T_1, T_2, T_3, T_4, T_5, T_6 \}$$

$$\frac{3}{12} = \frac{1}{4} \alpha$$

3- Four cards are chosen at random from a deck of 52 cards without replacement. What is the probability of choosing a ten, a nine, an eight and a seven in order?

$$P(10,9,8,7) = \frac{4}{52} \times \frac{4}{51} \times \frac{4}{50} \times \frac{4}{49} = \frac{256}{6497400} = \frac{32}{812175}$$

4- One card is drawn from a standard pack of 52 playing cards. What is the probability of (a) Picking a red card (b) picking a king (c) Picking a diamond?

a) Picking a red card = $\frac{26}{52} = \frac{1}{2}$

b) Picking a king = $\frac{4}{52} = \frac{1}{13}$

c) Picking a diamond = $\frac{13}{52} = \frac{1}{4}$

5- A jar contains 3 red marbles, 7 green marbles and 10 white marbles. If a marble is drawn from the jar at random, what is the probability that the marble is white?

Red = 3, 7 = Green, 10 = White, 20 = Total

$$\frac{\text{White}}{\text{Total}} = \frac{10}{20} = \frac{1}{2} = 0.5$$

write final answer in the form of statement.

6- The blood groups of 200 people are distributed as follows: 50 have type A blood, 65 have B blood type, 70 have O blood type and 15 have type AB blood. If a person from this group is selected at random, what is the probability that this person has O blood type?

$$\frac{70}{200} = \frac{7}{20} = 0.35$$

7. A bag that contains 6 blue marbles, 7 green marbles, and 3 red marbles. Find

a) What is the probability of selecting a green marble, replacing that marble, and then selecting a blue marble?

$$P(\text{Green and blue}) = P(G) \times P(B)$$

$$= \frac{7}{16} \times \frac{6}{16} = \frac{42}{256}$$

$$\begin{array}{r} \frac{7}{16} \\ \times \frac{6}{16} \\ \hline 42 \\ 196 \\ \hline 256 \end{array}$$

b) What is the probability of selecting a blue marble and then another blue marble without replacement?

$$P(\text{blue and blue}) = P(B) \times P(B)$$

$$= \frac{6}{16} \times \frac{5}{15} = \frac{30}{240} = \frac{1}{8}$$

c) What is the probability of selecting a green marble, without replacement, and then selecting a blue marble?

$$P(G \text{ and } B) = P(G) \times P(B)$$

$$= \frac{7}{16} \times \frac{6}{15} = \frac{42}{240} = 0.175$$

8. A coin is tossed and a die with numbers 1-6 is rolled. What is $P(\text{heads and } 3)$?

$$S = \{H_1, H_2, H_3, H_4, H_5, H_6, T_1, T_2, T_3, T_4, T_5, T_6\}$$

$$P(\text{heads}) = \frac{6}{12} = \frac{1}{2}$$

$$P(3) = \frac{2}{12} = \frac{1}{6}$$

$$P(\text{heads and } 3) = \frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$$

- A club has 25 members, 20 boys and 5 girls. Two members are selected at random to serve as president and vice president. What is the probability that both will be girls?

$$P(\text{both girls}) = \frac{5}{25} = \frac{1}{5}$$

10- Two cards are selected from a deck of cards numbered 1-10. Once a card is selected, it is not replaced. What is $P(\text{two even numbers})$?

$$\frac{20}{40} \cdot P(1-10) = \frac{20}{52}$$

$$P(\text{even number}) = \frac{20}{52} = 0.38$$

11- One marble is randomly drawn and then replaced from a jar containing two white marbles and one black marble. A second marble is drawn. What is the probability of drawing a white and then a black?

$$2 = \text{white} \quad 1 = \text{black} \quad \text{Total} = 3$$

$$P(\text{white and black}) = \frac{2}{3} \times \frac{1}{3} = \frac{2}{9}$$

12 Maria rolls a pair of dice. What is the probability that she obtains a sum that is either a multiple of 3 or a multiple of 4?

$$n = 6^2 = 36$$

$$S = \left\{ \begin{array}{l} (1,1) (1,2) (1,3) (1,4) (1,5) (1,6) \\ (2,1) (2,2) (2,3) (2,4) (2,5) (2,6) \\ (3,1) (3,2) (3,3) (3,4) (3,5) (3,6) \\ (4,1) (4,2) (4,3) (4,4) (4,5) (4,6) \\ (5,1) (5,2) (5,3) (5,4) (5,5) (5,6) \\ (6,1) (6,2) (6,3) (6,4) (6,5) (6,6) \end{array} \right\}$$

sum is

$$P(\text{multiple of 3 or 4}) = P(\text{multiple of 3}) + P(\text{multiple of 4})$$

$$= \frac{12}{36} + \frac{9}{36} = \frac{21}{36} = 0.58$$

13- Events A and B are independent. The $P(A) = 3/5$, and $P(\text{not } B) = 2/3$. What is $P(A \text{ and } B)$?

$$P(B) = 1 - P(\text{not } B) = 1 - 2/3 = 1/3$$

$$P(A) = 3/5$$

$$P(A \text{ and } B) = P(A) \times P(B)$$

$$P(A \text{ and } B) = \frac{3}{5} \times \frac{1}{3} = \frac{3}{15} = \frac{1}{5}$$

14- Twenty-six squares of paper lettered A to Z are placed in a can. One letter is randomly chosen from the can and turns out to be the letter G. A second letter is drawn without putting the letter G back into the can - what is the probability that it will be the letter F?

$$P(G) = 1/26$$

$$P(F) = 1/25$$

$$P(\text{letter F} | \text{letter G}) = \frac{1}{26} \times \frac{1}{25} = \frac{1}{650} = 0.001$$