Average

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

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

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

$$40 \times 3 = 120$$

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

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

$$65 \times 4 = 260$$

$$80 \times 2 = 160$$

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

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

Average Speed = 198.09

OR

$$\text{Average Speed} = \frac{2xy}{x+y} = \frac{2 \times 65 \times 80}{265 + 80} = \frac{10400}{145}$$

Average Speed = 71.72.

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?

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

Average speed = 4.8

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

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

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

9.75
10.25
8.50
28.50

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

40.0
28.5
11.5

$$F = 11.5$$

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

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

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

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

$$x_{5th} = 50$$

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

$$34 = \frac{\Sigma x}{3} \Rightarrow \Sigma x_1 = 102$$

$$36 = \frac{\Sigma x}{4} \Rightarrow \Sigma x_2 = 144$$

$$144 - 102 = 42$$

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.

$6^2 = 36$

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

a) equal to 1. = 0/36 = 0

b) equal to 4 : 3/36 = 1/12.

c) less than 13. = 1/36

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.

$S = \{H1, H2, H3, H4, H5, H6, T1, T2, T3, T4, T5, T6\}$

3/12 = 1/4

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 = 26/52

b) Picking a king = 4/52

c) Picking a diamond = 13/52.

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 this marble is white?

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

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

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 marble, and 3 red marbles. Find

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

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

$= \frac{7}{16} \times \frac{6}{16} = \frac{42}{1056}$

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

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

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

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(heads and 3)?

$S = \{H1, H2, H3, H4, H5, H6, T1, T2, T3, T4, T5, T6\}$

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

$P(3) = 2/12 = 1/6$

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

- 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(two even numbers)?

~~$\frac{20}{40} \cdot \frac{P(1-10)}{52} = \frac{2}{52}$~~

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

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 = white 1 = black 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?

$$n = 6^2 = 36$$

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

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

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

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

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

$P(A) = 3/5$

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

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

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?

$P(G) = 1/26$

$P(F) = 1/25$

$P(\text{letter F} \mid \text{letter G}) = \frac{1}{26} \times \frac{1}{25} = \frac{1}{650} = 0.0021$