Questions (Probability)

1. A pair of dice is tossed and the two numbers appearing on the top are recorded. Draw the sample space and find the number of elements in each of the following events:
   (a) A = { two numbers are equal }
   (b) B = { sum is 10 or more }
   (c) C = { 5 appears on first die }
   (d) D = { 5 appears on at least one die }

2. Determine the probability p of each event:
   (a) An even number appears in the toss of a fair die.
   (b) At least one tail appears in the toss of 3 fair die.
   (c) A white marble appears in the random drawing of 1 marble from a box containing 4 white marbles, 3 red marbles and 5 blue marbles.

3. A box contains 15 billiard balls, which are numbered from 1 to 15. A ball is drawn at random and the number recorded. Find the probability P that the number is;
   (a) Even
   (b) Less than 5
   (c) Even and less than 5
   (d) Even or less than 5

4. A class contains 10 men and 20 women of which half the women and half the men have brown eyes. Find the probability P that a person chosen at random is a man or has brown eyes.

5. Suppose A and B are events with $P(A) = 0.6$ and $P(B) = 0.3$ and $P(A \cap B) = 0.2$. Find the probability that:
   (a) A does not occur.
   (b) B does not occur.
   (c) A or B occurs.
   (d) Neither A nor B occurs.

6. Three fair coins, a penny, a nickel, and a dime, are tossed. Find the probability p that they are all heads if:
   (a) The penny is heads
   (b) At least one of the coins is heads,
   (c) The dime is tails

7. A billiard ball is drawn at random from a box containing 15 billiard balls numbered 1 to 15, and the number n is recorded.
   (a) Find the probability p that n exceeds 10.
   (b) If n is even, find the probability p that n exceeds 10.

8. In a certain college, 25 percent of the students failed mathematics, 15 percent failed chemistry, and 10 percent failed both mathematics and chemistry. A student is selected random.
   (a) If the student failed chemistry, what is the probability that he or she failed mathematics?
   (b) If the student failed mathematics, what is the probability that he or she failed chemistry?
   (c) What is the probability that the student failed mathematics or chemistry?
   (d) What is the probability that the student failed neither mathematics nor chemistry?

9. Find $P(B|A)$ if :
   (a) A is a subset of B.
   (b) A and B are mutually exclusive (disjoint) Assume $P(A) > 0$.

10. If the probabilities are, respectively, $0.09, 0.15, 0.21$, and 0.23 that a person purchasing a new automobile will choose the color green, white, red, or blue, what is the probability that a given buyer will purchase a new automobile that comes in one of those colors?

11. Suppose that a factory has a fuse box containing 20 fuses, of which 5 are defective. If 2 fuses are selected at random and removed from the box in succession without replacing the first, what is the probability that both fuses are defective?

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13. It is compulsory for the driver of a car to wear a seat belt while driving. The results of a survey show that not all drivers are wearing seat belts.

Age	Driver wearing seat belt	Driver not wearing seat belt
< 40	375	52
>= 40	425	148

Use the data to estimate the probability that a randomly chosen driver (a)
Is wearing a seat belt.

   (b) Is under 40 and wearing a seat belt.
   (c) Suppose the randomly chosen driver is under 40. What is the probability that the driver is wearing a seat belt?

14. A bag contains 6 blue balls and 4 red balls. Two balls will be drawn from the bag. Calculate the probability of either one of the balls is blue.