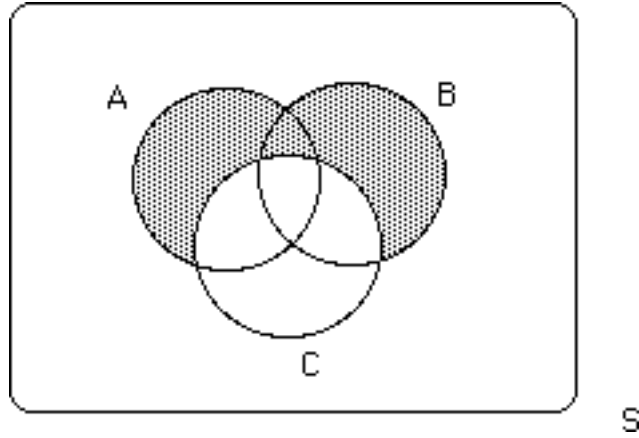


Student's name:.....

1. Which of the following sets is represented by the shaded area of the Venn diagram



Answers:

- (a) ABC , (b) $(A \cup B)\bar{C}$, (c) $(AB) \cup \bar{C}$, (d) $(A \cup B) \cup \bar{B}$, (e) $(\bar{B} \cup A)$.
-

A sample space contains six numbers: $S = \{1, 2, 3, 4, 5, 6\}$ Each element of S has the same probability. What are the probabilities of the following events:

2. $A = \{\text{even numbers}\}$, 3. $B = \{\text{numbers} \leq 4\}$, 4. $C = \{\text{numbers divisible by } 3\}$?

Answers to question 2, 3, 4:

- (a) 0, (b) $\frac{1}{3}$, (c) $\frac{1}{2}$, (d) $\frac{2}{3}$, (e) $\frac{3}{4}$.
-

5. Which of the following functions on the elements of the sample space $S = \{a, b, c, d\}$ are a probability functions?

$$P(a) = \frac{1}{2}, P(b) = \frac{1}{4}, P(c) = \frac{1}{8}, P(d) = \frac{1}{8},$$
$$Q(a) = \frac{1}{3}, Q(b) = \frac{1}{3}, Q(c) = \frac{1}{4}, Q(d) = \frac{1}{4},$$
$$R(a) = \frac{1}{4}, R(b) = \frac{1}{4}, R(c) = \frac{1}{4}, R(d) = \frac{1}{4}.$$

Answers:

- (a) P only (b) Q only, (c) P and R , (d) Q and R (e) P and Q

Five applicants, two male and three female, apply for two identical jobs, which will be given to two of the applicant. Assuming random choice what are the probabilities of the following events:

6. Both jobs went to women.

7. Both jobs went to men.

8. One job went to a woman and one to a man.

Answers to questions 6, 7, 8:

(a) 0.1, (b) 0.3, (c) 0.5, (d) 0.6, (e) 0.8.

9. If A and B are events, which of the following probabilities are possible?

I. $P(A) = \frac{1}{3}$, $P(B) = \frac{1}{4}$, $P(AB) = \frac{1}{2}$,

II. $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$, $P(AB) = \frac{1}{4}$,

III. $P(A) = \frac{2}{3}$, $P(B) = \frac{2}{3}$, $P(AB) = \frac{1}{4}$.

Answers:

(a) I only, (b) II only, (c) I and II, (d) II and III

(e) none of them

A box contains 8 red and 5 yellow marbles, of which a sample of three is drawn randomly. Find the probability that the sample contains no yellow marble,

10. if the sampling is done without replacement.

11. if the sampling is done with replacement

Answers to questions 10, 11:

(a) 0.15

(b) 0.20,

(c) 0.23,

(d) 0.50, (e) 0.64

12. A shipment of 20 components will be accepted by the buyer if a random sample of 3, chosen without replacement, contains no defective component. The shipment contains 2 defective components. What is the probability that it will be rejected?

Answers:

- (a) 0.02, (b) 0.12, (c) 0.28, (d) 0.42, (e) 0.53
-

13. Three missiles, whose probabilities of hitting the target are 0.7, 0.8 and 0.9 respectively have been launched. What is the probability that the target was hit?

Answers:

- (a) 0.300, (b) 0.552, (c) 0.885, (d) 0.925 (e) 0.994
-

There are three distinct methods A , B , C for teaching a certain industrial skill. The failure rates, when using these methods are 30%, 20% and 10% respectively. Due to the cost involved, method A is used twice as often as method B , and method B twice as often as method C . What are the probabilities

14. that a trainee was taught by method A ?

15. that a trainee was taught by method B ?

16. that a trainee failed to learn the skill?

17. that the trainee who failed was taught by method A .

Answers to questions 14 - 17:

- (a) 0.14, (b) 0.24, (c) 0.29, (d) 0.57, (e) 0.71.