



CREST Mathematics Olympiad (CMO) Worksheet *for* Class 10



Topic
Probability



@crestolympiads



info@crestolympiads.com



+91-98182-94134

Worksheet on Probability

1. The three events P, Q and R are as follows:

Event P: If an integer is chosen at random from 1 to 50, then the probability that the number is 'divisible by 5'.

Event Q: A box contains 2 red, 3 black and 5 white balls. If a ball is drawn at random, then the probability that the ball drawn is a 'red ball'.

Event R: English letters are arranged in a row. If a letter is chosen at random from the letters of the English alphabet, then the probability is that it is a letter of the word 'JAGUAR'.

Which of the above events have probabilities equal to 0.2?

- a. Both events P and Q
 - b. Both events Q and R
 - c. Both events R and P
 - d. All events P, Q and R
2. A bag contains some blue balls and 45 red balls. If the probability of drawing a blue ball is three-fifths of a red ball, then what is the number of blue balls in the bag?
- a. 21
 - b. 23
 - c. 27
 - d. 29
3. Cards are labelled as c, d, e,....., s, t. They are put in a box and shuffled. A student is asked to draw a card from the box. What is the probability that the card draws none of the letters of the word 'jacket'?
- a. 33
 - b. 53
 - c. 67
 - d. 87

4. The events are as follows:

Event C: If a card is selected at random from a pack of 52 cards, then a blackface card is found.

Event D: If a dice is thrown, then an odd number more than 2 is found on the top of a dice.

Event T: If a ticket is drawn at random from a box containing tickets numbered 1 to 25, then the selected ticket has a number which is a multiple of 7.

Which of the above events have probabilities equal to $\frac{1}{3}$?

- a. Both events C and D
- b. Both events D and T
- c. Both events T and C
- d. All events C, D and T

5. What is the probability when two dice are thrown simultaneously whose sum is at most 7?

- a. $36/42$
- b. $36/49$
- c. $49/64$
- d. $49/84$

Answer Key

1. a - Both events P and Q

Explanation:

Event P:

Total number of outcomes = 50

Number of favourable outcomes {5, 10, 15, 20, 25, 30, 35, 40, 45, 50} = 10

Required Probability = $10/50 = 1/5 = 0.2$

Event Q:

Number of red balls = 2

Number of black balls = 3

Number of white balls = 5

Total number of balls = $2 + 3 + 5 = 10$

Probability of getting a red ball = $2/10 = 1/5 = 0.2$

Event R:

Total number of English alphabets = 26

Letters of JAGUAR {A, G, J, U, R} = 5

Required Probability = $5/26 = 0.19$

∴ Both events P and Q have probabilities equal to 0.2.

2. c - 27

Explanation: Let the bag contain x blue balls.

Number of red balls = 45

Total number of balls in a bag = $x + 45$

Probability of drawing a blue ball = $\frac{x}{x + 45}$

Probability of drawing a red ball = $\frac{45}{x + 45}$

According to the question,

Probability of drawing a blue ball is three-fifths of a red ball.

$$\Rightarrow \frac{x}{x+45} = \frac{3}{5} \times \frac{45}{x+45}$$

$$\Rightarrow x = \frac{3 \times 45}{5}$$

$$\therefore x = 27$$

3. c - 0.67

Explanation: $S = \{c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t\}$

Total number of cards = $n(S) = 18$

$E = \{j, a, c, k, e, t\} = \{a, c, e, k, j, t\}$

Number of the letters in the word 'jacket' = $n(E) = 6$

Number of letters not in the word 'jacket' = $n(E') = n(S) - n(E) = 18 - 6 = 12$

Probability that the card draws none of the letters of the word 'jacket'

$$= \frac{n(E')}{n(S)} = \frac{12}{18} = 0.67$$

4. b - Both events D and T

Explanation:

Event C: Total number of cards = 52

Number of black face cards = $3 \times 2 = 6$

Required Probability = $6/52 = 3/26$

Event D: A die is thrown.

Total number of events = 6

Total number of odd numbers more than 2 = 2 (i.e., 3, 5)

Required Probability = $2/6 = 1/3$

Event T: There are a total 25 tickets in a bag.

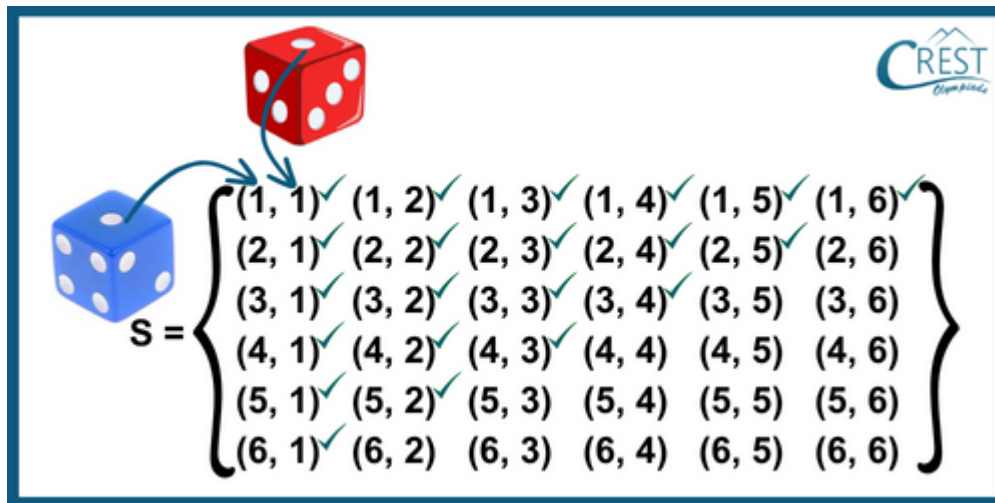
Number of tickets which is multiple of 7 = 3 (7, 14 and 21)

Required Probability = $3/15 = 1/3$

Both events D and T have probabilities equal to $1/3$.

5. d - 49/84

Explanation: The sum includes numbers that are both less than 7 and equal to 7. The sum that at most is 7 is marked as



Total Outcomes = $n(s) = 36$

Favourable Outcomes = $n(E) = 21$

Probability when two dice are thrown simultaneously whose sum is at most 7.

$P(E) = n(E)/n(s) = 21/36 = 7/12$

$7/12 = 49/84$

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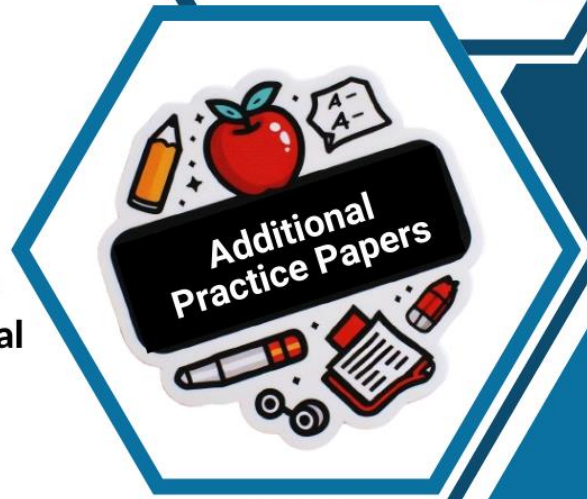
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