Talent & Olympiad

Probability

1. What is the probability of getting a prime number in a throw of a die?

(a) 2	(b) $\frac{1}{2}$
2	

- (c) $\frac{3}{2}$ (d) 6
- **2.** What is, the probability that a vowel selected at random in English alphabet is an "i"?
 - (a) $\frac{1}{5}$ (b) $\frac{1}{26}$ (c) $\frac{1}{6}$ (d) 1
- **3.** When two dice are thrown, what is the probability of always getting a number greater than 4 on the second dice?
 - (a) $\frac{1}{6}$ (b) $\frac{1}{3}$ (c) $\frac{1}{36}$ (d) $\frac{1}{2}$
- **4.** What is the probability for a leap year to have 52 Mondays and 53 Sundays?

(a) $\frac{1}{366}$	(b)	$\frac{1}{52}$
(c) $\frac{2}{7}$	(d)	$\frac{1}{7}$

5. Cm In a single throw of two dice, what is the probability of getting a sum of 10?

(a) $\frac{1}{12}$	(b) $\frac{1}{36}$
(c) $\frac{1}{6}$	(d) $\frac{1}{8}$

6. Three letters, to each of which corresponds an addressed envelope are placed in the envelopes at random. What is the probability that all letters are placed in the right envelopes?

(a)
$$\frac{1}{3}$$
 (b) 1
(c) $\frac{1}{6}$ (d) 0

7. From a normal pack of cards, a card is drawn at random. Find the probability of getting a jack or a king.

(a)
$$\frac{2}{52}$$
 (b) $\frac{1}{52}$
(c) $\frac{2}{13}$ (d) $\frac{1}{26}$

8. Two numbers are chosen from 1 to 5. What is the probability for the two numbers to be consecutive?

(a)
$$\frac{1}{5}$$
 (b) $\frac{2}{5}$
(c) $\frac{1}{10}$ (d) $\frac{2}{10}$

9. Two dice are thrown at a time. What is the probability that the difference of the numbers shown on the dice is 1?

(a) $\frac{5}{18}$	(b) $\frac{1}{36}$
(c) $\frac{1}{6}$	(d) $\frac{1}{12}$

- **10.** A bag contains 3 white and 5 red balls. If a ball is drawn at random, what is the probability that it is red?
 - (a) $\frac{3}{8}$ (b) $\frac{5}{8}$ (c) $\frac{3}{15}$ (d) $\frac{5}{15}$
- **11.** What is the probability of getting an even number when a die is rolled?
 - (a) $\frac{1}{6}$ (b) $\frac{1}{36}$ (c) $\frac{1}{2}$ (d) $\frac{1}{12}$

12. OA card is drawn from a packet of 100 cards numbered 1 to 100. Find the probability of drawing a number which is a square.

(a)
$$\frac{1}{10}$$
 (b) $\frac{9}{100}$
(c) $\frac{1}{100}$ (d) $\frac{2}{100}$

13. A book containing 100 pages is opened at random. What is the probability that a doublet page is found?

(a)
$$\frac{9}{100}$$

(b)
$$\frac{50}{100}$$

(c) $\frac{10}{100}$

(d)
$$\frac{100}{100}$$

14. If a coin is tossed twice, find the probability of getting at least one head.

(a) $\frac{1}{2}$	(b) $\frac{1}{4}$
(c) $\frac{3}{4}$	(d) $\frac{1}{8}$

15. Find the probability of getting a number greater than 2 or an even number in a single throw of a fair die.

(a) $\frac{1}{3}$	(b) $\frac{2}{3}$
(c) $\frac{5}{6}$	(d) $\frac{3}{5}$

16. Find the probability that in a family of 3 children, there is at least one boy.

(a)
$$\frac{3}{4}$$

(b) $\frac{1}{8}$
(c) $\frac{4}{8}$
(d) $\frac{5}{8}$

17. What is the chance that a non-leap year contains 53 Saturdays?

(a)
$$\frac{2}{7}$$
 (b) $\frac{1}{7}$
(c) $\frac{2}{365}$ (d) $\frac{1}{365}$

18. From a well shuffled pack of cards, one card is drawn at random. What is the probability that the card drawn is a king?

(a)	$\frac{12}{13}$	(b)	$\frac{1}{13}$
(c)	$\frac{3}{13}$	(d)	$\frac{1}{2}$

19. An unbiased coin is tossed. What is the probability that neither head nor tail turns up?

(a) 1	(b) $\frac{1}{2}$
(c) 0	(d) $\frac{1}{3}$

- **20.** A box contains 7 red, 3 white and 2 black balls, when a ball is picked at random from the box what is the probability that it is not red?
 - (a) $\frac{1}{12}$ (b) $\frac{11}{12}$ (c) $\frac{7}{12}$ (d) $\frac{5}{12}$
- 21. An unbiased coin is tossed 5 times. What is the odds in favour of getting at least one tail?
 (a) 31 :1
 (b) 1 :31
- (c) 32:32 (d) 31 :3222. A coin is tossed successively three times.
- 22. A coin is tossed successively three times. What is the probability of getting exactly one head or two heads?

(a)
$$\frac{3}{4}$$
 (b) $\frac{1}{4}$
(c) $\frac{1}{3}$ (d) $\frac{2}{3}$

23. Three of the six vertices of a regular hexagon are chosen at random. What is the probability that the triangle with these vertices is equilateral?

(a)
$$\frac{1}{5}$$
 (b) $\frac{2}{5}$
(c) $\frac{1}{10}$ (d) $\frac{3}{10}$

24. A coin is tossed successively three times. What is the probability of getting exactly one head or two heads?

(a)	$\frac{3}{4}$		(b)	$\frac{1}{4}$
(c)	$\frac{1}{3}$		(d)	$\frac{2}{3}$

If $P(A) = \frac{1}{3}$, $P(B) = \frac{1}{2}$ and A and B are 25. mutually exclusive, find $P(A' \cap B')$.

(a) $\frac{5}{6}$	(b) $\frac{1}{6}$
(c) $\frac{1}{5}$	(d) $\frac{2}{5}$

The probability that A can win a race is $\frac{3}{8}$ **26**. and the probability that B can win it is $\frac{1}{6}$. If both run in a race, what is the probability that one of them will win the race, assuming that both cannot win together? 17

(a)	$\frac{17}{24}$	(b)	$\frac{13}{24}$
(c)	$\frac{13}{24}$	(d)	$\frac{11}{24}$

27. A chess piece is randomly selected from a box that contains all the pieces used in the game of chess. Identify the sample space of this experiment.

(a) {King, Queen, Bishop, Knight}

- (b) 1,2,3,4,5,6,7
- (c) {Bishop, Castle, King, Pawn, Queen, Knight}
- (d) {King, Knight, Pawn, Ace, Queen, Castle, Bishop}

- 28. A month is randomly selected from a year. An event X is defined as 'the month with 30 days'. Identify the number of outcomes of event X.
 - (a) 1
 - (b) B
 - (c) 3
 - (d) 4

(a) 1

(c) 3

29. A spinner is spun. What is the number of possible outcomes of the event that the arrow will stop in the sector with an odd number.



30. Turn the given cards facing down and shuffle.



Turn one card facing up. What is the probability that it shows a circle?

(a) $\frac{2}{7}$	(b) $\frac{5}{7}$
(c) $\frac{3}{7}$	(d) $\frac{1}{7}$

- 31. A restaurant operator checked a sample of 200 plates and found that 10 of them were defective. The chef of the restaurant picks a plate from this sample. What is the probability that he will get a defective plate? (a) 0.5 (b) 0.05 (c) 0.2 (d) 20
- 32. Two dice are rolled at once and the numbers shown are added up. What is the probability of getting a total of 14?
 - (a) $\frac{1}{2}$
 - (b) 1
 - (c) 0

 - (d) $\frac{2}{3}$

33. The given figure shows 10 alphabet cards.

S	w	Е	E	Т
С	0	R	Ν	S

What is the probability of getting a card labelled 'S' when the card is chosen at random?

(a) $\frac{1}{5}$	(b) $\frac{2}{5}$
(c) $\frac{1}{10}$	(d) $\frac{1}{6}$

34. A weather forecast center predicts that it will rain for 3 days in a duration of 20 days. Find the probability of rain on a particular day.

(a) $\frac{17}{20}$	(b) $\frac{3}{17}$
(c) $\frac{20}{17}$	(d) $\frac{3}{20}$

35. 90% of the mangoes in a bag are good. If a mango is chosen randomly from the box, find the probability of getting a bad mango.

(a)	$\frac{9}{100}$	(b)	$\frac{1}{100}$
(c)	$\frac{9}{10}$	(d)	$\frac{1}{10}$

36. A fair coin is tossed thrice. Identify the probability of getting 3 tails as a fraction.

(a) $\frac{1}{8}$	(b) $\frac{3}{8}$
(c) $\frac{7}{8}$	(d) $\frac{1}{4}$

37. The given figure shows two circles such that the radius of the small shaded circle is $\frac{1}{3}$. times the radius of the big circle. A dart is thrown randomly towards the circle. Find the probability that the dart hits the shaded target.



38. 7 marbles shown are kept in a tin. (1) (2) (3) (1) (2) (4) (2) If a marble is taken out randomly from the tin, state the probability that the marble has the number 2. (a) $\frac{2}{3}$ (b) $\frac{3}{3}$

(a)
$$\frac{2}{7}$$
 (b) $\frac{3}{7}$
(c) $\frac{5}{7}$ (d) $\frac{4}{7}$

39. Two fair dice are thrown. Find the probability that both dice show different numbers.

(a)
$$\frac{1}{6}$$
 (b) $\frac{5}{6}$
(c) $\frac{32}{36}$ (d) $\frac{29}{36}$

- **40.** A box contains 24 coloured marbles. Eighteen of then are yellow and the rest are either red or blue. A marble is picked at random. Find the probability of picking an yellow marble.
 - (a) $\frac{1}{4}$ (b) $\frac{3}{4}$ (c) $\frac{3}{8}$ (d) $\frac{1}{8}$
- **41.** A certain class has 's' students. If a student is picked at random, the probability of picking a boy is $\frac{8}{13}$. If the class has 24 boys, what is the value of 's'? (a) 26 (b) 39 (c) 52 (d) 60
- **42.** A box contains 60 pens which are blue inked or black-inked. If a pen is picked at random, the probability of picking a blue-inked pen is .What is the number of blue-inked pens in the box?

(a) 32	(b) 48
(c) 30	(d) 24

- **43.** A certain class has 45 students. If a student is picked at random, the probability of picking a prefect is $\frac{1}{3}$. How many students in the class are not prefects? (a) 60 (b) 15 (c) 30 (d) 70
- **44.** A bag contains several coloured balls. 28 of them are red. If a ball is drawn at random, the probability of drawing a red ball is $\frac{4}{9}$. *x* balls are added into the box. A ball is then drawn at random. If the probability of drawing a red ball is now $\frac{1}{2}$, find the value of

(a) 4	(b) 6
(c) 5	(d) 7

- **45.** A bag contains 40 coins, consisting of 2, 5 and 10 denominations. If a coin is drawn at random, the probability of drawing a 2 coin is $\frac{5}{8}$. If x 2 coins are removed from the bag and then a coin is drawn at random, the probability of drawing a 2 coin is $\frac{1}{2}$. Find the value of x. (a) 5 (b) 2 (c) 10 (d) 8
- **46.** The given incomplete table shows the number of coins in a box.

Coins	`1	` 2	` 5	10	50 р
Amount	6	12	8	10	?

If a coin is drawn at random. the probability of drawing a 2 coin is $\frac{3}{10}$. Find the probability of drawing a 50 p coin.

(a)
$$\frac{1}{10}$$

(b) $\frac{2}{10}$
(c) $\frac{1}{5}$
(d) $\frac{2}{10}$

(d) $\frac{15}{15}$

47. A factory has 120 workers in January. 90 of them are female workers. In February, another 15 male workers were employed. A worker is then picked at random. Calculate the probability of picking a female worker.

(a)
$$\frac{3}{4}$$
 (b) $\frac{4}{9}$
(c) $\frac{2}{3}$ (d) $\frac{1}{3}$

- **48.** A box contains a number of marbles with serial number 18 to 38.A marble is picked at a random. Find the probability that it is a multiple of 3.
 - (a) $\frac{3}{5}$ (b) $\frac{7}{20}$ (c) $\frac{3}{4}$ (d) $\frac{1}{3}$
- **49.** A box contains 40 marbles of red and blue colour. If a marble is picked at random, the probability of picking a blue marble is $\frac{3}{8}$. Rana takes out one red marble and nine blue marbles and then picks a marble at random. Find the probability that it is a blue marble.

(a)
$$\frac{4}{5}$$
 (b) $\frac{2}{5}$
(c) $\frac{7}{40}$ (d) $\frac{1}{3}$

50. Set $P = \{x: 5 \le x \le 22, x \text{ is an integer}\}$. If an element from set P is picked at random, calculate the probability that it is a prime number.

(a)
$$\frac{5}{18}$$
 (b) $\frac{1}{3}$

(c)
$$\frac{7}{9}$$
 (d) $\frac{5}{6}$

51. A box contains 32 coloured marbles. Eight of them are red marbles and the rest are either blue or green marbles. A marble is drawn at random. Calculate the probability of drawing a marble which is not red in colour.

(a)
$$\frac{2}{3}$$
 (b) $\frac{5}{8}$
(c) $\frac{3}{4}$ (d) $\frac{7}{16}$

52. A Suppose a die is dropped at random on the rectangular region as shown in the figure.



What is the probability that it will land inside the circle with diameter 2 m?

(a)
$$\frac{\pi}{8}$$
 (b) $\frac{\pi}{28}$
(c) $\frac{1}{12}$ (d) $\frac{1}{18}$

53. A lottery has a 0.00002 probability of winning first prize. How many tickets have been sold for the lottery?

(a) 2000	(b) 50000
(c) 2000	(d) 100000

54. 250 tickets are sold for a raffle. A girl calculates that the tickets bought by her family give them a 0.032 probability of winning first prize. How many tickets did the family buy?

(a) 60	(b) 9
(c) 50	(d) 8

55. All the three cards of spades are removed from a well-shuffled pack of 52 cards. A card is drawn at random from the remaining pack. Find the probability of getting a queen?

(a) $\frac{3}{52}$	(b) $\frac{3}{49}$
(a) 1	(1)

(c) $\frac{1}{26}$ (d) $\frac{1}{52}$

56. A box contains 20 balls bearing numbers 1,2,3,...,20.A ball is drawn at random from the box. What is the probability that the number on the balls is not divisible by 10?

(a)
$$\frac{9}{10}$$
 (b) $\frac{1}{10}$
(c) $\frac{9}{5}$ (d) $\frac{1}{5}$

57. A coin is tossed two times. Find the probability of getting a tail at least once.

(a) $\frac{3}{4}$	(b) $\frac{2}{3}$
(c) $\frac{3}{5}$	(d) $\frac{1}{5}$

58. If a leap year is selected at random what is the probability that it will contain 53 Tuesdays?

(a)
$$\frac{1}{7}$$
 (b) $\frac{2}{7}$
(c) $\frac{3}{7}$ (d) $\frac{4}{7}$

- **59.** If $P(A \cup B) = 0.65, P(A \cap B) = 0.15$, find $P(\overline{A}) + P(\overline{B})$. (a) 1.5 (b) 1.4 (c) 1.3 (d) 1.2
- **60.** If the odds in favour of winning a race by three horses are respectively 1 : 4, 1 : 5 and 1 :6, find the probability that one of these horses will win.

(a)	$\frac{37}{60}$	(b)	$\frac{39}{60}$
(c)	$\frac{41}{60}$	(d)	$\frac{51}{60}$

61. Two dice are rolled at once. What is the probability of getting an even number on the first die or a total of 8?

(a) $\frac{4}{2}$	(b)	5
`´9	()	9

(c)
$$\frac{7}{9}$$
 (d) $\frac{2}{9}$

Answer - Keys											
1.	В	2.	А	3.	В	4.	D	5.	A	6.	С
7.	С	8.	В	9.	А	10.	В	11.	С	12.	A
13.	A	14.	С	15.	С	16.	А	17.	В	18.	В
19.	С	20.	D	21.	А	22.	А	23.	С	24.	А
25.	В	26.	С	27.	С	28.	D	29.	В	30.	А
31.	В	32.	С	33.	А	34.	D	35.	D	36.	А
37.	С	38.	В	39.	В	40.	В	41.	В	42.	D
43.	С	44.	D	45.	С	46.	А	47.	С	48.	D
49.	D	50.	В	51.	С	52.	В	53.	В	54.	D
55.	В	56.	А	57.	А	58.	В	59.	D	60.	A
61.	В										

Solutions

- **1.** (b) Not available
- **2.** (a) Not available
- **3.** (b) Not available
- **4.** (d) Not available
- **5.** (a) Not available
- **6.** (c) Not available
- **7.** (c) Not available
- **8.** (b) Not available
- **9.** (a) Not available
- **10.** (b) Not available
- 11. (c) $E = \{2,4,6\} \Rightarrow n(E) = 3$ $S = \{1,2,3,4,5,6\} \Rightarrow n(S) = 6$ ∴ $p(E) = \frac{n(E)}{n(S)} = \frac{3}{6} = \frac{1}{2}$
- **12.** (a) E = {1,4,9,16,25,36,49,64,81,100} n(E)=10 S = {1, 2, 3, 100} ⇒ n(S) = 100 ∴ $p(E) = \frac{n(E)}{n(S)} = \frac{10}{100} = \frac{1}{10}$
- **13.** (a) E = {11,22,33,44, 55,66,77,88,99} ⇒ n(E) = 9S = {1, 2, 3, 100} ⇒ n(s) = 100 ∴ $p(E) = \frac{9}{100}$
- 14. (c) $S = \{HH, HT, TH, TT\} \Rightarrow n(s) = 4$ $E = \{HT, TH, HH\} \Rightarrow n(E) = 3$

$$\therefore p(E) = \frac{n(E)}{n(S)} = \frac{3}{4}$$

- **15.** (c) E = {2, 3, 4, 5, 6} ⇒ n(E) = 5 S = {1, 2, 3, 4, 5, 6} ⇒ n(S) = 6 ∴ $p(E) = \frac{n(E)}{n(S)} = \frac{5}{6}$
- **16.** (a) Not available
- **17.** (b) Not available
- **18.** (b) Not available
- **19.** (c) Not available
- **20.** (d) Not available
- **21.** (a) Not available
- **22.** (a) Not available
- **23.** (c) Not available
- **24.** (a) Not available
- **25.** (b) Not available
- 26. (c) Let A be the event that A wins and B be the event that B wins. ∴ P (one of them will win) = P(A∪B) = P(A) + P(B) (Since, A and B are mutually exclusive.) $= \frac{3}{8} + \frac{1}{6} = \frac{13}{24}$
- 27. (c) The sample space is S = {Bishop, Castle, King, Pawn, Queen, Knight}.
- **28.** (d) X = {April, June, September, November}

Hence, n(X) = 4

- **29.** (b) $X = \{1,3\}$ Hence, n(X)=2.
- **30.** (a) Since there are 7 cards, n(S)=7. Let A be the event of picking a card having a circle, n(A)=2. The probability of picking a card having a circle $P(A) = \frac{n(A)}{n(S)} = \frac{2}{7}$
- 31. (b) Since there are 200 plates, n(S) = 200.
 Let B be the event of picking a defective plate. Then, n(B) = 10.

The probability of picking a defective plate

$$= P(B) = \frac{n(B)}{n(S)} = \frac{10}{200} = 0.05$$

- **32.** (c) Not available
- **33.** (a) Not available
- **34.** (d) Not available
- **35.** (d) Not available
- **36.** (a) Not available
- **37.** (c) Area of big circle $= S = \pi r^2$ Area of shaded circle,

$$A = \pi \left(\frac{1}{3}r\right)^2 = \frac{\pi r^2}{9}$$
$$\therefore P(A) = \frac{n(A)}{n(S)} = \frac{\pi r^2}{\pi r^2} = \frac{1}{9}$$

- **38.** (b) Not available
- **39.** (b) Not available
- **40.** (b) Not available

- **41.** (b) Not available
- **42.** (d) Not available
- **43.** (c) Not available

44. (d) Let
$$n(S) = s, n(R) = 28$$

$$P(R) = \frac{n(R)}{n(S)} \Rightarrow \frac{4}{9} = \frac{28}{S} \text{ or } S = 63$$
Now, $\frac{28+x}{63+x} = \frac{1}{2}$

$$\Rightarrow x = 7$$

45. (c)
$$n(S) = 40$$
, let $n(C) = C$
 $P(C) = \frac{5}{8} \Rightarrow \frac{C}{40} = \frac{5}{8}$ or $C = 25$
Now, $\frac{25 - x}{40 - x} = \frac{1}{2} \Rightarrow x = 10$

- **46.** (a) Not available
- **47.** (c) Not available
- **48.** (d) Not available
- **49.** (d) Not available
- **50.** (b) Not available

51. (c)
$$n(S) = 32, n(R) = 8$$

 $p(R) = \frac{8}{32} = \frac{1}{4}$
 \therefore The probability of

 \therefore The probability of drawing a marble which is not red in colour

$$=1-\frac{1}{4}=\frac{3}{4}$$

52. (b) n(S) = Area of rectangle

= 7×4 = 28 m²

$$n(A)$$
 = Area of circle = $\pi r^2 = \pi (1)^2 = \pi$
 \therefore Probability = $\frac{n(A)}{n(S)} = \frac{\pi}{28}$

53. (b)
$$P(A) = \frac{n(A)}{n(S)}$$

 $0.00002 = \frac{1}{n(S)}$
 $n(S) = \frac{1}{0.00002} = 50000$

- 54. (d) $0.032 = \frac{n(A)}{250}$ $n(A) = 250 \times 0.032$ n(A) = 8
- 55. (b) Total number of cards = 523 face cards of spades are removed.Then remaining cards = 49

$$\therefore$$
 P (a queen) = $\frac{3}{49}$

- **56.** (a) Numbers divisible by 10 from 1 to 20 are 10 and 20 i.e., 18 numbers are not divisible by 10. $\therefore P(A) = \frac{n(A)}{n(S)} = \frac{18}{20} = \frac{9}{10}$
- **57.** (a) Not available
- **58.** (b) Not available
- **59.** (d) Not available
- **60.** (a) Not available
- **61.** (b) Not available