

Class : IXTH

Date :

Subject : MATHS

DPP No. : 2

THE MATHEMATICS OF MAY BE : INTRODUCTION TO PROBABILITY

1. A teacher mixes a large bag of sweets of different colours and randomly selects a sample of 30 sweets. She counts the number of sweets of each colour:
10 red sweets | 8 green sweets | 7 yellow sweets | 5 blue sweets
 - (i) Calculate the probability that a randomly picked sweet from the sample is green.
 - (ii) If there are 600 sweets in total in the large bag, estimate how many are likely to be yellow, based on the sample results.
2. A survey is conducted at a school where a random sample of 40 students is asked about their favourite club. The responses are: 14 students: Science Club | 11 students: Arts Club | 9 students: Sports Club | 6 students: Debate Club. Assume there are 800 students in the whole school.
 - (i) What is the probability that a randomly chosen student from the sample prefers the Arts Club?
 - (ii) Using the sample results, estimate how many students in the whole school are likely to prefer the Sports Club.
3. Toss a coin 20 times and record the result each time (heads or tails).
 - (i) How many times did you get heads?
 - (ii) How many times did you get tails?
 - (iii) Calculate the experimental probability of getting heads.
 - (iv) If you toss the coin once more, what is the probability of getting tails?
4. Toss a paper cup into the air 100 times. After each toss record whether the cup lands on its bottom, upside down on its top or on its side. Assign probabilities to the outcomes by using experimental probability.
5. Suppose you roll a 6-sided die 12 times and get a "3" three times.
 - (i) What is the experimental probability of rolling a "3"?
 - (ii) What is the theoretical probability of rolling a "3"?
 - (iii) Why might these probabilities be different? What would you expect to happen if you roll the die 60, 600 or 6000 times?



6. For the following experiments write down the sample space S .
- Rolling a die and tossing a coin together.
 - Choosing a random integer between -5 and +5 .
 - A box containing 5 green and 7 red balls. One ball is drawn at random.
7. In a village fair, there are 3 popular snacks available: Samosa, Pakora, and Bhaji. For drinks, villagers can choose either Chai or Lassi.
- List the sample space of all possible snack and drink combinations a person could choose at the fair.
 - List the event "Selecting Samosa as a snack." Also find its probability.
8. There are two fruit baskets A and B . Basket A has one apple and two oranges. Basket B has one banana and one mango. You randomly pick one fruit from each basket.
- Draw a tree diagram showing all possible pairs of fruits.
 - List the sample space.
 - What is the probability of picking one apple and one banana?
9. Let us say that you have a box containing 3 red pens, 4 black pens and 2 green pens. You pick a pen (without looking) from the box and put it back. Then your friend does the same.
- What are the possible outcomes of the pen colours? Can you draw a tree diagram representing the possible outcomes?
 - Can you use the tree diagram to guess the probability that both you and your friend pick pens of the same colour?
10. Fill in the Blanks
- The probability of an impossible event is ____.
 - The set of all possible outcomes of a random experiment is called the ____.
 - The probability of an event that is ____ certain to happen is.
 - Tossing a fair coin has a probability of ____ for getting heads.
11. In a survey of 50 students, 15 students said they liked football. The.....
(frequency/relative frequency) of students who like football is 15 . and the.....
(frequency/relative frequency) is(fill in the fraction or decimal).
12. Write the sample space and calculate the probability based on the given information.
- Two coins are tossed at the same time. What is the probability of getting at least one head?
 - Ten identical cards numbered 1 to 10 are placed in a box. One card is drawn at random. What is the probability of drawing a card with an even number?
 - A die is rolled once. What is the probability of getting a number greater than 4?
 - A bag contains 3 red balls, 2 blue balls and 1 green ball. One ball is picked at random. What is the probability that it is not red?



(v) Three coins are tossed simultaneously. What is the probability of getting exactly two heads?

13. A child has 2 shirts (one red and one blue) and 3 types of pants (jeans, khakis, and shorts). List all the possible combinations of outfits consisting of one shirt and one pair of pants. Display your answer in a table format.

14. A tyre company records distances before replacement in 1000 cases.

Distance (km)	Frequency
Less than 4000	20
4001 to 9000	210
9001 to 14000	325
More than 14000	445

Find the probability that a randomly chosen tyre lasts:

- (i) Less than 4000 km.
- (ii) Between 4000 and 14000 km.
- (iii) More than 14000 km.

15. The letters of the word PEACE are placed on cards. Leela draws a card without looking.

P	E	A	C	E
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- (i) What is the probability that it is a P, E or C ?
- (ii) What is the probability that it is not an E ?

ANSWER KEY

- 1. (i) $\frac{4}{15}$ (ii) 140
- 2. (i) $\frac{11}{40}$ (ii) 180
- 5. (i) $\frac{1}{4}$ (ii) $\frac{1}{6}$
(iii) For 6000 rolls, we can expect the number of 3s to be very close to 1000.
- 6. (i) {(Samosa, Chai), (Samosa, Lassi), (Pakora, Chai), (Pakora, Lassi), (Bhaji, Chai), (Bhaji, Lassi)}



(ii) $\{(Samosa, Chai), (Samosa, Lassi)\}, \frac{1}{3}$

12. (i) $\frac{3}{4}$ (ii) $\frac{1}{2}$ (iii) $\frac{1}{3}$ (iv) $\frac{1}{2}$ (v) $\frac{3}{8}$

14. (i) $\frac{1}{50}$ (ii) $\frac{107}{200}$ (iii) $\frac{89}{200}$

15. (i) $\frac{4}{5}$ (ii) $\frac{3}{5}$

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