

Algebra

[1] Find the solution set of the following equation in R:

(1) $2X^2 - 5X - 3 = 0$

(2) $X^2 + X = 6$

(3) $12X^2 = 47X - 45$

(4) $5X^2 + 12X = 44$

(5) $2X^3 = 18X$

[2] Selecting random a card out of 40 similar cards in a box numbered from 1 to 40. Find the probability of getting a card that carries:

(a) An even number

(b) A number is not divisible by 10

(c) A prime number is less than 20

(d) A number divisible by 3

(e) An even number is divisible by 3

(f) A perfect square number

[3] Drawing randomly a coloured marble out of a box containing 12 red marbles, 18 white marbles and 20 blue marbles. Find the probability of selecting:

[1] A yellow marble

[2] A white marble

[3] A red marble

[4] A red or blue marble

[5] non-red marble

[6] A red and blue marble

The answer

[1] Find the solution set of the following equation in R:

$$(1) 2X^2 - 5X - 3 = 0$$

$$(2X + 1)(X - 3) = 0$$

$$2X + 1 = 0 \quad \text{or} \quad X - 3 = 0$$

$$X = \frac{-1}{2} \quad \text{or} \quad X = 3 \quad \text{S.S} = \left\{ \frac{-1}{2}, 3 \right\}$$

$$(2) X^2 + X = 6$$

$$X^2 + X - 6 = 0$$

$$(X + 3)(X - 2) = 0$$

$$X + 3 = 0 \quad \text{or} \quad X - 2 = 0$$

$$X = -3 \quad \text{or} \quad X = 2 \quad \text{S.S} = \{-3, 2\}$$

$$(3) 12X^2 = 47X - 45$$

$$12X^2 - 47X + 45 = 0$$

$$(4X - 9)(3X - 5) = 0$$

$$4X - 9 = 0 \quad \text{or} \quad 3X - 5 = 0$$

$$4X = 9 \quad \text{or} \quad 3X = 5$$

$$X = \frac{9}{4} \quad \text{or} \quad X = \frac{5}{3} \quad \text{S.S} = \left\{ \frac{9}{4}, \frac{5}{3} \right\}$$

$$(4) 5X^2 + 12X = 44$$

$$5X^2 + 12X - 44 = 0$$

$$(5X + 22)(X - 2) = 0$$

(c) The prime numbers less than 20 are 2, 3, 5, 7, 11, 13, 17 and 19

$$\text{The probability} = \frac{20}{40} = \frac{1}{2}$$

(d) The numbers from 1 to 40 which are divisible by 3 are 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36 and 39

$$\text{The probability} = \frac{20}{40} = \frac{1}{2}$$

(e) The even numbers divisible by 3 are 6, 12, 18, 24, 30, 36

$$\text{The probability} = \frac{20}{40} = \frac{1}{2}$$

(f) The perfect square numbers are 1, 4, 9, 16, 25 and 36

$$\text{The probability} = \frac{6}{40} = \frac{3}{20}$$

[3] Drawing randomly a coloured marble out of a box containing 12 red marbles, 18 white marbles and 20 blue marbles. Find the probability of selecting:

[1] A yellow marble

[2] A white marble

[3] A red marble

[4] A red or blue marble

[5] non-red marble

[6] A red and blue marble

Solution

$$\text{The total number of marbles} = 12 + 18 + 20 = 50$$

[1] The probability that the marble is yellow = 0

$$[2] \text{ The probability that the marble is white} = \frac{18}{50} = \frac{9}{25}$$

$$[3] \text{ The probability that the marble is red marble} = \frac{12}{50} = \frac{6}{25}$$

$$[4] \text{ The probability that the marble is red or blue marble} = \frac{16}{25}$$

$$[5] \text{ The probability that the marble is non-red marble} = \frac{19}{25}$$

[6] The probability that the marble is red and blue marble = 0