Simple revision for Mathematics for first Preparatory

Algebra

[1] Find each of the following:

[a] $\sqrt{16}$

[b] $-\sqrt{25}$

[c] $\pm\sqrt{40000}$

[d] $\sqrt{\frac{9}{49}}$

[e] $-\sqrt{\frac{64}{25}}$

[f] $\pm\sqrt{1.44}$

[g] $\pm\sqrt{8^2}$

[h] $-\sqrt{4^2}$

[i] $\sqrt{\left(\frac{81}{100}\right)}$

[j] $-\sqrt{\frac{49a^4}{25b^6}}$

[k] $\pm\sqrt{\frac{49a^4b^2}{9}}$

[L] $\sqrt{\frac{25X^2Y^2}{36}}$

Solution

[a] $\sqrt{16} = 4$

[b] $-\sqrt{25} = -5$

[c] $\pm\sqrt{40000} = \pm 20$

[d] $\sqrt{\frac{9}{49}} = \frac{3}{7}$

[e] $-\sqrt{\frac{64}{25}} = -\frac{8}{5} = -1.6$

[f] $\pm\sqrt{1.44} = \pm 1.2$

[g] $\pm\sqrt{8^2} = \pm 8$

[h] $-\sqrt{4^2} = -4$

[i] $\sqrt{\left(\frac{81}{100}\right)^2} = \frac{81}{100}$

[j] $-\sqrt{\frac{49a^4}{25b^6}} = -\frac{7a^2}{5b^3}$

[k] $\pm\sqrt{\frac{49a^4b^2}{9}} = \pm\frac{7a^2b}{3}$

[L] $\sqrt{\frac{25X^2Y^2}{36}} = \frac{5XY}{6}$

[2] Find the solution set of each of the following equations:

(a) $X + 17 = 13$ where $X \in N$

(b) $-4 + y = 13$ where $X \in N$

(c) $M - (-3) = 1$ where $X \in Z$

(d) $3(X + 2) + 7(X - 1) = 12$ where $X \in Q$

(e) $X + 3 = 18 - 3X$ where $X \in Q$

Solution

(a) $X + 17 = 13$ where $X \in N$

$X = 13 - 17 = -7 \notin N$

$S.S = \phi$

(b) $-4 + y = 13$ where $X \in N$

$y = 13 + 4 = 17 \in N$

$S.S = \{ 17 \}$

(c) $M - (-3) = 1$ where $X \in Z$

$M = 1 + (-3) = -2 \in Z$

$S.S = \{ -2 \}$

(d) $3(X + 2) + 7(X - 1) = 12$

$3X + 6 + 7X - 7 = 12$

$10X - 1 = 12$

$10 X = 12 + 1 = 13$

$X = 13 \div 10 = 1.3 \in Q$

$S.S = \{ 1.3 \}$

(e) $X + 3 = 18 - 3X$

$X + 3X = 18 - 3$

$4X = 15$

$X = 15 \div 4 = 3.75 \in Q$

$S.S = \{ 3.75 \}$

[3] Find the solution set of the following inequalities in Q:

[a] $2X + 3 < 9$

[b] $8X - 3X + 1 \leq 29$

[c] $4n - 2(n - 1) \geq 0$

Solution

$\therefore$ (a) $2X + 3 < 9$

$2X < 9 - 3$

$2X < 6$

$X < 3$

$S.S = \{ X : X \in Q, X < 3 \}$

(b) $8X - 3X + 1 \leq 29$

$5X + 1 \leq 29$

$5X \leq 29 - 1$

$X \leq \frac{28}{5}$

$S.S = \{ X : X \in Q, X \leq \frac{28}{5} \}$

(c) $4n - 2(n - 1) \geq 0$

$4n - 2n + 2 \geq 0$

$2n + 2 \geq 0$

$2n \geq -2$

$n \geq -1$

$S.S = \{ n : n \in Q, n \geq -1 \}$

[4] A fair die is rolled once. Calculate the probability of rolling:

(a) An even number

(b) A prime number

(c) A number greater than 3

(d) A number satisfies: $2 < X < 3$

(e) A number equal to 4

(f) A number more than 7

(g) A number divisible by 3

Solution

$$S = \{ 1 , 2 , 3 , 4 , 5 , 6 \}$$

(a) The probability of an even number = $\frac{3}{6} = \frac{1}{2}$

(b) The probability of a prime number = $\frac{3}{6} = \frac{1}{2}$

(c) The probability of a number greater than 3 = $\frac{3}{6} = \frac{1}{2}$

(d) The probability of a number satisfies the inequality $2 < X < 3 = 0$

(e) The probability of a number equal to 4 = $\frac{1}{6}$

(f) The probability of a number more than 7 = 0

(g) The probability of a number divisible by 3 = $\frac{2}{6} = \frac{1}{3}$

---

[5] A card is drawn from a bag of 25 cards numbered from 1 to 25.

Calculate the probability that the drawn card carries:

(a) A number divisible by 5

(b) A number ≥ 20

(c) A perfect square number

(d) A prime number

Solution

(a) The probability of a number divisible by 5 = $\frac{5}{25} = \frac{1}{5}$

(b) The probability of a number ≥ 20 = $\frac{6}{25}$

(c) The probability of a perfect square number = $\frac{5}{25}$ = $\frac{1}{5}$

(d) The probability of a prime number = $\frac{9}{25}$