Probability Assignment

Sec.6

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1. (c) 2/7

A week has 7 days , total days are 366

Number of sundays in a leap year = 52 sundays and 2 days

Total outcomes of 2 days = 7 ⇒ Number of outcomes without sundays = 5

→ probability of Leap year with 53 sundays = 2/7 .

2. (c) 0/5

No black balls in the bag (imposible event)

3. (c) 3/20

Probability that it will rain tomorrow = .85 ⇒ will not rain = 1 − .85 = .15

4. (a) 1/5

The numbers that are multiple to 4 are {4, 8, 12}

probability = $\frac{3}{15} = \frac{1}{5}$

5. (c) 8

⇒ Total outcomes when we throw 3 coins = $2^3 = 8$

6. (b) 11/35

⇒ Prime numbers From 1 to 35 are {2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31}

P(E1) = 11 / 35

7. (b) 1

Sum of any event and its complement = 1

8. (c) 7/5

$0 \leq P(E) \leq 1$, $7/5 > 1$

[9] (c) 1/2

Tossing 3 coins ⟹ {HHH, HHT, HTT, HTH, TTT, TTH, THT, THH}

→ getting at least 2 heads = 4/8 = 1/2

[10] (d) none of these

ASSASSINATION ⟹ 13 Letters

[11] (D) 1/2

dice is thrown → {1, 2, 3, 4, 5, 6}

P(even number) = 3/6 = 1/2

[12] (B) 1/4

Two coins are thrown → {HH, HT, TT, TH}

P(getting both heads) = 1/4

[13] (c) 1/9

Two dice are thrown ⟹ outcomes = $6^2 = 36$

Probability of getting sum of 9 is {(3,6), (6,3), (4,5), (5,4)} = 4/36 = 1/9

[14] (c) 1/4

number of prime numbers from 1 to 100 = 25 ⟹ Probability = 25/100 = 1/4

[15] (B) 10

5 red balls and some blue balls, P(blue) = 2 P(red)

$$\frac{n.blue}{n.blue+5} = 2 \times \frac{5}{n.blue+5}$$

∴ number of blue balls = 10

[16] (B) 147/150

Number of non-defective bulbs = 600 − 12 = 588

P(non-defective bulb) = 588/600 = 49/50 = 147/150

[17] (A) 9/100

Perfect square are {4, 9, 16, 25, 36, 49, 64, 81, 100} = 9 numbers

Probability = 9/100

[18] (C) 2/7

[19] (A) 1/26

P(getting a King of red suit) = 2/52 = 1/26

[20] (A) 1/6

{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12}

n(odd numbers) = 6 P(an odd number) = 1/6

[21] (A) 3/4

tossing 3 coins {HHH, HHT, HTH, HTT, TTT, TTH, THT, THH}

Probability of winning = 2/8 = 1/4

Probability of losing = 6/8 = 3/4

[22] (C) 1/365

[23] (C) 3/5

square of numbers 4, 1, 0, 1, 4

Total number For with $X^2 < 2$ are = 3/5

[24] (C) 8

Let number of White = X → number of red = 24 - X

$$\frac{24-X}{24} = \frac{2}{3} \qquad \therefore X = 8$$

∴ number of White = 8

25 (D) 2/25

multiple of 3 = 3, 6, 9, 12, 15, 18, ... 48 → number of multiple of 3 = 16

" " 4 = 4, 8, 12, 16, 20, 24, ... 48 → " " " " 4 = 12

number of multiples of 3 and 4 = 4 {12, 24, 36, 48}

P(E) = 4/50 = 2/25

26 (d) 4/21

$P(n \text{ dots}) \propto n$ n → From 1 to 6

$P(n \text{ dots}) = Kn$

$\Sigma P_i = 1$ $K+2K+3K+4K+5K+6K = 1$ $\therefore K = \frac{1}{21}$

Probability of Face showing Four dots = $4K = 4/21$

27 (a) 25.79

$(\bar{X}) = \frac{50+70+82+93+20}{5} = 63$

$\therefore$ standard devision $= \sqrt{\frac{(50-63)^2+(70-63)^2+(82-63)^2+(93-63)^2+(20-63)^2}{5}}$

$= 25.79$

28 (b) 13, 18

Arranging terms in ascending order 4, 5, 9, 11, 13, 15, 17, 18, 18

Median = $\frac{n+1}{2}$ term (as n = 9(odd)) = 13

Mode = 18 which is repeated twice

29 (c) 1/4

A Coin is tossed up 4 times {HHHH, THHH, HHTH, HHTT, HHHT, HTHH THTT, HTTH, HTTT, THHT, THTH, HTHT, TTHH, TTHT, TTTH, TTTT}

P(E) = 4/16 = 1/4

30 (d) 9

$E(X^2) = 3^2 = 9$

31 (d) 7

$Var(Z) = Var(5X - 2Y)$

$= Var(5X) + Var(2Y) = 25\,Var(X) + 4\,Var(Y) = 25 \times .2 + 4 \times .5 = 7$

32 (d) $P(x) = -.5$

Probability cannot be negative

33 (a) 2

$E(Z - X) = E(Z) - E(X) = 4 - 2 = 2$

34 (b) 0

35 (c) 3

$\Sigma P(x) = K^2 - 8 = 1 \qquad K^2 = 9 \qquad \therefore K = 3$

36 (d) 2

$E(X) = X\,P(X) = 4 \times .5 = 2$

37 (c) 1

38 (a) .4 , .24

$P = .4 \quad , \quad q = 1 - P = 1 - .4 = .6$

mean = .4 and Variance = $pq = (.4)(.6) = .24$

39 (b) 6 , 2.4

$P = 60\% = .6 \quad , \quad q = 1 - P = 1 - .6 = .4 \quad , \quad n = 10$

mean = $np = 10 \times .6 = 6$ and Variance = $npq = 10(.4)(.6) = 2.4$

40 (b) 4

$P = 1/2 \qquad$ mean = $np = 8 \times (1/2) = 4$

41 (a) Mean is 0 and Variance is 1

42 (c) $E(X2)-(E(X))2$

43 (a) $E(x)$

44 (b) a

45 (a) 0

46 (a) 2 , $4/3$

47 (b) 1.5

48 (b) npq

49 (b) $P(X=x) = nCx \times P^x \times q^{(n-x)}$

50 (d) $\sqrt{npq}$