MATHS

BOOKS - MARVEL MATHS (HINGLISH)

PROBABILITY DISTRIBUTIONS

Mcqs

1. If the function P (X=x) =kx,.....x=1,2,3,4,5=0 ....otherwise

is a probability mass function (p.m.f.) ,then : k=....

A. $\frac{1}{14}$

B. $\frac{1}{15}$

C. $\frac{1}{16}$

D. none of these

Answer: B

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2. Detemine k such that the following funciton is a p.m.f

$$P(X = x) = k\left(\frac{2^x}{x!}\right), x = 0, 1, 2, 3$$

=0 otherwise .

A. $\frac{1}{19}$

B. $\frac{2}{19}$

C. $\frac{3}{19}$

D. none of these

Answer: C

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3. Find k ,such that the function

$$P(x) = \left\{ \left(k \binom{4}{x}, , x = 0,1,2,3,4, k > 0 \right), (0, \text{otherwise.}) \right.$$

is a probability mass function (p.m.f.)

A. $\frac{1}{4}$

B. $\frac{1}{16}$

C. $\frac{1}{64}$

D. none of these

Answer: B

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4. The p.m.f. of a r.v. X is as follows :

$P(X=0)=3k^3, P(X=1)=4k-10k^2, P(X=2)=5k-1$

,

$P(X=x)=0$ for any other values of x, then k =

A. 1

B. $\frac{1}{2}$

C. $\frac{1}{3}$

D. $\frac{1}{4}$

Answer: C

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5. If the p.d.f. of a c.r.v. X is

$$f(x) = \begin{cases} kx^2(1-x^3), 0 \leq x \leq 1 \\ 0, \qquad\qquad elsewhere \end{cases}$$

then :k...

A. 6

B. 5

C. 4

D. 3

Answer: A

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6. The p.d.f. of a c.r.v. X is

$$f(x) = \begin{cases} k.\sin\left(\frac{\pi x}{5}\right), 0 \leq x \leq 5 \\ 0, \qquad\qquad elsewhere \end{cases}$$

then :k=.....

A. $\frac{\pi}{2}$

B. $\frac{\pi}{5}$

C. $\frac{\pi}{10}$

D. none of these

Answer: C

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7. The p.m.f. of a r.v. X is $P(x) = \begin{cases} kx, x = 1,2,3 \\ 0, \text{therwise} \end{cases}$, then k =

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{1}{4}$

D. $\frac{1}{5}$

Answer: A

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8. The p.d.f. of a.c.r. X is

$$f(x) = \begin{cases} \frac{1}{2}, 0 < x < 2 \\ 0, \qquad otherwise \end{cases}$$

Then P $(X < 1.5)$ and $P(X > 1)$ are

A. $0.25, 0.50$

B. $0.75, 0.5$

C. $0.6, 0.27$

D. none of these

Answer: B

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9. If the p.d.f. of a c.r.v. X is

$$f(x) = \begin{cases} \frac{1}{4}, & -1 < x < 3 \\ 0, & otherwise \end{cases}$$

then : P $(X > 0) = .$

A. 0.25

B. 0.50

C. 0.75

D. 1

Answer: C

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10. if the p.d.f of a a.c.r.v X is

$$f(x) = \begin{cases} \frac{x}{8}, 0 < x < 4 \\ 0, \qquad otherwise \end{cases}$$

then $P(X < 1)$ and $(P(X \geq 2)$ are

A. $\frac{1}{16}, \frac{3}{4}$

B. $\frac{1}{4}, \frac{3}{8}$

C. $\frac{5}{8}, \frac{7}{16}$

D. none of these

Answer: A

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11. If a curve X has probability density function (pdf)

$$f(x) = \begin{cases} ax, 0 \leq x \leq 1 \\ a, 1 \leq x \leq 2 \\ 3a - ax, 2 \leq x \leq 3 \\ 0, \text{otherewise} \end{cases}$$

Then, a is equal to

A. 1

B. $\frac{1}{3}$

C. $\frac{1}{2}$

D. $\frac{1}{5}$

Answer: C

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12. The p.m.f. of a r.v. X is $P(x) = \begin{cases} \frac{1}{15}, x = 1,2,\ldots,15 \\ 0, \text{otherwise} \end{cases}$, then

Var (X) =

A. $\frac{1}{4}$

B. $\frac{1}{5}$

C. $\frac{1}{6}$

D. $\frac{1}{7}$

Answer: D

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13. P.d.f. of a c.r.v X is

$$f(x) = \begin{cases} 6x(1-x), 0 \leq x \leq 1 \\ 0, \qquad\qquad elsewhere \end{cases}$$

If P $(X < a) = P(X > a)$ then : a =..

A. 1

B. $\frac{1}{2}$

C. $\frac{1}{3}$

D. $\frac{1}{4}$

Answer: B

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14. A c.r.v X has the p.d.f

$$f(x) = \begin{cases} 3x^2, 0 \leq x \leq 1 \\ 0, \qquad\qquad elsewhere \end{cases}$$

If P$(X \leq a) = P(X > a), then: a = ..$

A. $\frac{1}{2^{\frac{1}{3}}}$

B. 1

C. $\frac{1}{3^{\frac{1}{3}}}$

D. $\frac{1}{4^{\frac{1}{3}}}$

Answer: A

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15. The life in hours of a ratio tube is continuous random variable with pdf

$$f(x) = \begin{cases} \frac{100}{x^2}, x \geq 100 \\ 0, \text{else where} \end{cases}$$

Then, the probability that the life of tube will than 200 h if it is known that th tube is still functioning after 150 h of services is

A. $\frac{1}{4}$

B. $\frac{1}{3}$

C. $\frac{1}{2}$

D. none of these

Answer: A

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16. The amount of bread x (in hundreds os pounds) that a bakery sells in a day has a P.d.f :

$$f(x) = \begin{cases} kx, & 0 \leq x < 5 \\ k(10-x), & 5 \leq x < 10 \\ 0, & otherwise \end{cases}$$

Then the probability that the amount of bread that will be sold tomorrow will be less than 500 pound is ..

A. $\frac{1}{4}$

B. $\frac{1}{3}$

C. $\frac{1}{2}$

D. none of these

Answer: C

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17. The p.m.f. of a r.v. X is $P(x) = \begin{cases} \frac{c}{x^3}, x = 1,2,3 \\ 0, \text{otherwise} \end{cases}$, then E (X) =

A. $\frac{343}{297}$

B. $\frac{294}{251}$

C. $\frac{297}{294}$

D. none of these

Answer: B

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18. The p.m.f. of a r.v. X is $P(x) = \begin{cases} kx^2, x = 1,2,3,4 \\ 0, \text{otherwise} \end{cases}$, then E (X) =

A. 1.6111

B. 0.49

C. 0.59

D. 0.69

Answer: D

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19. A fair coin is tosed 3 times. A person receives $\mathrm{Rs.}\ X^2$ if he gets X number of heads in all. His expected gain is

A. 1

B. 2

C. 3

D. 4

Answer: C

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20. The p.d.f. of X is $f(x) = \begin{cases} \frac{x^2}{18}, -3 < x < 3 \\ 0, \text{otherwise} \end{cases}$, then $P(|X| < 1) =$

A. $\frac{1}{27}$

B. $\frac{1}{28}$

C. $\frac{1}{29}$

D. none of these

Answer: A

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21. The p.d.f. of X is $f(x) = \begin{cases} \frac{x+2}{18}, -2 < x < 4 \\ 0, \text{otherwise} \end{cases}$, then $P(|X| < 1) =$

A. $\frac{1}{9}$

B. $\frac{2}{9}$

C. $\frac{3}{9}$

D. $\frac{4}{9}$

Answer: B

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22. Given : $f(x) = \begin{cases} \frac{1}{x^2}, 1 < x < \infty \\ 0, \quad elsewhere \end{cases}$ is p.d.f. of c.r.v X

If $A: 1 < x < 2$ and $B: 4 < x < 5, then: P(A \cup B) = \ldots$

A. 0.33

B. 0.44

C. 0.55

D. 0.66

Answer: C

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23. The p.d.f. of a r.v. X is $f(x) = \begin{cases} \frac{1}{x^2}, 1 < x < \infty \\ 0, \text{otherwise} \end{cases}$, then F (x) =

A. $\frac{1}{x} - 1$

B. $1 - \frac{1}{x}$

C. $x + \frac{1}{x}$

D. $x - \frac{1}{x}$

Answer: B

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24. The p.d.f of a random variable X is given by

$f(x) = 3\left(1 - 2x^2\right), 0 < x < 1$

= 0 , otherwise

Find $P\left(\frac{1}{4} < X < \frac{1}{3}\right)$

A. $\frac{216}{864}$

B. $\frac{179}{864}$

C. $\frac{179}{216}$

D. none of these

Answer: B

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25. Given the p.d.f of a continous r.v.X was

$$f(x) = \frac{x^2}{3}, \ -1 < x < 2$$

=0, Otherwise

Determine the c.d.f of X and hence find .

$$P(X < 1), P(X \leq -2), P(X > 0), P(1 < X < 2)$$

A. $2x - 3x^2$

B. $3x - 4x^3$

C. $3x - 2x^3$

D. none of these

Answer: C

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26. The p.m.f. of a r.v. is

$$P(X=x)=\begin{cases}\frac{1}{2^5}{}^5C_x, x=0,1,\ldots,5\\ 0, \text{otherwise}\end{cases}, \text{then}$$

A. $a<b$

B. $a>$

C. a=b

D. none of these

Answer: C

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27. The p.m.f. of a r.v. X is $P(x)=\begin{cases}\frac{2x}{n(n+1)} & x=1,2,\ldots.,n\\ 0 & \text{otherwise}\end{cases}$

Then E(X) =

A. $\frac{n}{1}+\frac{1}{2}$

B. $\frac{n}{3}+\frac{1}{6}$

C. $\frac{n}{2}+\frac{1}{5}$

D. none of these

Answer: B

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28. The pdf of a curve X is

$$f(x)=\begin{cases}\frac{k}{\sqrt{x}}, 0<x<4\\ 0, x\leq 0 \text{ or } x\geq 4\end{cases}$$

Then , $P(X\geq 1)$ is equal to

A. 0.2

B. 0.3

C. 0.4

D. 0.5

Answer: D

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29. If the p.d.f of a c.r.v X is

$f(x) = \frac{3+2x}{18}, 2 \leq x \leq 4$ =0 .. Otherwise ,

then the Mathematical Exapectation of X is

A. $\frac{83}{27}$

B. $\frac{27}{83}$

C. $\frac{87}{23}$

D. $\frac{38}{72}$

Answer: A

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30. If the p.d.f. of a r.v. X is

$f(x) = K.\, e^{-\theta x}, \theta > 0, 0 \leq x < \infty$

$= 0$, otherwise

Then, K =

A. 1

B. $\frac{\theta}{2}$

C. θ

D. 2θ

Answer: C

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31. If p.d.f. of a a c.r.v. X is

$f(x) = ae^{-ax}, x \geq 0, a > 0$

$= 0$, otherwise.

If $P(0 < X < K) = 0.5$, then K =

A. $\frac{1}{2}.\log a$

B. $\frac{1}{a}.\log 2$

C. $\frac{1}{2}.\log 2$

D. $\frac{1}{a}.\log a$

Answer: B

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32. The time (X) one has to wait for a bus at a downtown bus - stop has the following P.d.f .

$$f(x)=\begin{cases}0, x<0\\ \frac{1}{9}(x+1), 0\le x<1\\ \frac{4}{9}\left(x-\frac{1}{2}\right), 1\le x<\frac{3}{2}\\ \frac{4}{9}\left(\frac{5}{2}-x\right), \frac{3}{2}\le x<2\\ \frac{1}{9}(4-x), 2\le x<3\\ \frac{1}{9}, 3\le x<6\\ 0, \qquad\qquad x\ge 6\end{cases}$$

$If A: 0\le x\le 2, B: 1\le x\le 3$

then the values of P(B|A) and P (A' ∩ B') are ..

A. $\frac{1}{4}, \frac{3}{4}$

B. $\frac{2}{3}, \frac{1}{3}$

C. $\frac{1}{6}, \frac{5}{6}$

D. none of these

Answer: B

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33. A random variable X takes the values $0, 1, 2, 3, \ldots,$ with prbability $PX(=x) = k(x+1)\left(\frac{1}{5}\right)^x$, where k is a constant, then $P(X=0)$ is.

A. $\frac{7}{25}$

B. $\frac{16}{25}$

C. $\frac{18}{25}$

D. $\frac{19}{25}$

Answer: B

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34. A random variate X takes the values 0, 1, 2, 3 and its mean is 1.3. If $P(X=3)=2P(X=1)$ and $P(X=2)=0.3$, then $P(X=0)$ is equal to

A. 0.1

B. 0.2

C. 0.3

D. 0.4

Answer: D

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35. If in a distribution each x is replaced by corresponding value of $f(x)$, then the probability of getting $f(x)$, when the

probability of getting $x_i is p_i$, is.

A. p_i

B. $f(p_i)$

C. $f\left(\frac{1}{p_i}\right)$

D. none of these

Answer: A

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36. If the range ot a random vaniabie X is $0, 1, 2, 3,$ at $P(X = K) = \left(\frac{K+1}{3^k}\right)$ a for $k \geq 0,$ then a equals

A. $\frac{2}{3}$

B. $\frac{2}{9}$

C. $\frac{8}{27}$

D. $\frac{16}{81}$

Answer: B

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37. If X follows a binomial distribution with parameters $n = 6$ and p. If $4(P(X = 4)) = P(X = 2)$, then $P =$

A. $\frac{1}{2}$

B. $\frac{1}{4}$

C. $\frac{1}{6}$

D. $\frac{1}{3}$

Answer: D

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38. Seven chits are numbered 1 to 7. Four chits are drawn one by one with replacment. The probability that the least number appearing on any selected chit is 5 is :

A. $\left(\frac{3}{7}\right)^4$

B. $\left(\frac{6}{7}\right)^3$

C. $\frac{5 \times 4 \times 3}{7^3}$

D. $\left(\frac{3}{4}\right)^4$

Answer: A

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39. An unbiased die is thrown . X dentes the number on the face of the die . Then E(x) where x $\geq$ 1 is :

A. $\frac{3}{2}$

B. $\frac{5}{2}$

C. $\frac{7}{2}$

D. $\frac{9}{2}$

Answer: C

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40. Three numbers are chosen from 1 to 20. Find the probability that they are consecutive.

A. $\frac{1}{60}$

B. $\frac{3}{190}$

C. $\frac{1}{57}$

D. $\frac{3}{20}$

Answer: B

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41. Two cards are drawn from a well shuffled pack of 52 cards. The probability that one is heart card and the other is a king is p, then the value of 104p is____.

A. $\frac{1}{51}$

B. $\frac{1}{26}$

C. $\frac{2}{51}$

D. $\frac{1}{34}$

Answer: D

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42. A and B are two events such that $P(A \cup B) = 0.5$, $P(A \cap B) = 0.3$, $P(B) = 0.4$ then $P(A' \mid B') =$

A. $\frac{1}{2}$

B. $\frac{3}{5}$

C. $\frac{2}{5}$

D. $\frac{5}{6}$

Answer: D

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43. Given $P(A \cup B) = 0.6, P(A \cap B) = 0.2$, then probability of exactly one of the event occurs is

A. 0.3

B. 0.2

C. 0.4

D. 0.8

Answer: C

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44. From a group of 8 boys and 3 girls, a committee of 5 members to be formed. Find the probability that 2 particular girls are included in the committee.

A. $\frac{2}{11}$

B. $\frac{4}{11}$

C. $\frac{3}{11}$

D. $\frac{5}{11}$

Answer: A

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45. If P (A) =0.8, P(B)=0.6, P$(A \cap B) = 0.5,$ then P(B'|A')=

A. $\frac{1}{3}$

B. $\frac{1}{2}$

C. $\frac{1}{4}$

D. $\frac{1}{5}$

Answer: B

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46. If two dice are thrown together . Then , the probability that the sum of the numbers appearing on them is a prime number, is

A. $1/2$

B. $3/7$

C. $5/12$

D. $7/12$

Answer: C

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47. A four digit number is to be formed using the digits 1,2,3, 4, 5,6,7 (no digit is being repeated in any number) . Then , the probability that it is > 4000 , is

A. $3/2$

B. $1/2$

C. $4/7$

D. $3/7$

Answer: C

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48. Two coins are tossed simultaneously. Then, the value of E(X), where X denotes the number of heads is

A. $\frac{1}{2}$

B. 2

C. 1

D. 1.05

Answer: C

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49. If P (A) =0.4,P(B)=0.8 and $P(A \cap B) = 0.3$ then the probability that exactly one of them occurs is

A. 0.2

B. 0.4

C. 0.6

D. 0.1

Answer: C

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50. An urn contains 4 black and 6 red balls. If two balls are drawn at random from the urn without replacement ,then the probability that both are black is

A. $\frac{1}{5}$

B. $\frac{1}{15}$

C. $\frac{2}{15}$

D. $\frac{13}{15}$

Answer: C

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51. Two fair coins are tossed .if X represents the number of tails obtained then V(X)=

A. 2

B. $\frac{3}{2}$

C. $\frac{2}{3}$

D. $\frac{1}{2}$

Answer: D

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