# MATHS

## BOOKS - NIKITA MATHS (HINGLISH)

## PROBABILITY DISTRIBUTION

Mcqs

**1.** A random variable is said to be discrete, if

A. it takes infinite values

B. it takes countably infinite values

C. it takes uncountably infinite values

D. it takes any values

**Answer: B**

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**2.** A random variable is said to be continuous, if

A. it takes uncountably infinite values

B. it takes countably infinite values

C. it takes countably finite values

D. it takes uncountably finite values

**Answer: A**

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**3.** If X is the r.v. having values from sample space S and P (x) is the p.m.f. of X, $x \in S$, then

A. $0 < P(x) \leq 1, \quad \text{for all} \quad x \in S$

B. $0 \leq P(x) < 1, \quad \text{fol all} \quad x \in S$

C. $0 < P(x) < 1, \quad \text{for all} \quad x \in S$

D. $\sum_{x_i = S} P(x) = 1$

**Answer: D**

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**4.** If X is a r.v., then

A. Var $(X) \geq 0$

B. Var $(X) > 0$

C. Var $(X) = 0$

D. Var $(X) \neq 0$

**Answer: A**

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**5.** If X is a continuous r.v., then the function f(x) is said to p.d.f. of X, if

A. $f(x) = 0 \quad \text{for all} \quad x \in R$

B. $f(x) \neq 0 \quad \text{for all} \quad x \in R$

C. $\int_{-\infty}^{\infty} f(x)dx = 1$

D. $f(x) \leq 0 \quad \text{for all} \quad x \in R$

**Answer: C**

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**6.** Number of attempts required by a candidate to clear I.A.S. examination.

Then the random variable is

A. continuous

B. discrete

C. not continuous

D. not discrete

**Answer: B::C**

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**7.** Four cars are selected from a showroom.

X = Number of cars having diesel engine.

Then the random variable is

A. not discrete

B. not continuous

C. discrete

D. continuous

**Answer: B::C**

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**8.** A highway-safety group is interested in studying the speed (in km/hour) of a car at a check point. Then the random

variable is

A. continuous

B. discrete

C. not continuous

D. not discrete

**Answer: A**

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**9.** A page in a book can have at most 300 words. X = Number of misprints on a page.

Then the random variable is

A. not discrete

B. not continuous

C. discrete

D. continuous

**Answer: B::C**

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**10.** The random variable X is the amount of syrup prescript by a physician.

Then the random variable is

A. discrete

B. continuous

C. not discrete

D. not continuous

**Answer: B::C**

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**11.** Number of floors in a building.

Then the random variable is

A. not continuous

B. not discrete

C. continuous

D. discrete

**Answer: A::D**

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**12.** 20 white rats are available for an experiment. Twelve rats are males and remaining are females. A scientist randomly selected 5 rats and X = Number of female rats selected on a specific day.

Then the random variable is

A. not continuous

B. not discrete

C. continuous

D. discrete

**Answer: D**

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**13.** A sample of 10 batteries is selected X = Number of batteries that failed within 1000 hours.

Then the random variable is

A. not continuous

B. not discrete

C. continuous

D. discrete

**Answer: A::D**

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**14.** Number of students present in a class of 50 students

Then the random variable is

A. not continuous

B. not discrete

C. continuous

D. discrete

**Answer: D**

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**15.** A social worker is interested in knowing the number of illiterates in a group of 1000 slum dwellers.

Then the radom variable is

A. discrete

B. continuous

C. not continuous

D. not discrete

**Answer: A**

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**16.** A person on a high protein diet is interested in the random variable X, the gain in weight in a week.

Then the random variable is

A. not continuous

B. not discrete

C. continuous

D. discrete

**Answer: C**

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**17.** If a RV X="Height of a sky scrapper" Then the random variable is

A. not continuous

B. not discrete

C. continuous

D. discrete

**Answer: C**

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**18.** An economist is interested in the random variable X, the number of unemployed graduates in a town of population 1 lakh.

Then the random variable is

A. discrete

B. continuous

C. not continuous

D. not discrete

**Answer: A::C**

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**19.** A player goes to gymnasium ragularly. X = Reduction in his weight in a month. Then the random variable is

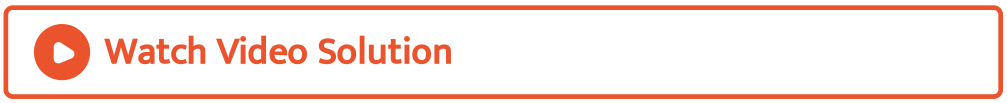
A. continuous

B. discrete

C. not continuous

D. not discrete

**Answer: A::D**




**20.** A quality control manager notes down the life times of 10 electronic components.

Then the random variable is

A. discrete

B. continuous

C. not continuous

D. not discrete

**Answer: B**

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**21.** If $P(X = x) = \frac{x - 5}{4}, x = 5.5, 6.5, 7.5,$ then

A. f is a p.m.f.

B. f is not a p.m.f.

C. $\sum_{x_i = S} P(X = x) = 1$

D. $\sum_{x_i = S} P(X = x) = \frac{9}{4}$

**Answer: B**

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**22.** If $P(X=x)=\begin{cases}\frac{x^2}{5}, x=0,1,2\\ 0, \text{ otherwise}\end{cases}$, then

A. $\sum_{x_i=S} P(X=x) \neq 1$

B. $\sum_{x_i=S} P(X=x) = 2$

C. f is not a p.m.f.

D. f is a p.m.f.

**Answer: D**

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**23.** If $P(X=x)=\begin{cases}\frac{x-1}{3}, x=1,2,3\\ 0, \text{otherwise}\end{cases}$, then

A. $\sum_{x_i=S} P(X=x) \neq 1$

B. $\sum_{x_i=S} P(X=x) = 2$

C. f is a p.m.f.

D. f is not a p.m.f.

**Answer: C**

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**24.** A fair die is thrown once. The probability distribution of the number of points appearing on the uppermost face is

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**25.** Obtain the probobility distribution of the number of sixes in two tosses of a fair die.

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**26.** Two fair dice are thrown. The probability distribution of the sum of the numbers appearing on the uppermost face is

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**27.** Two fair dice are thrown. If X denotes the sum of the numbers appearing on the uppermost face, then $P(2 < X < 10)$

A. $\frac{29}{36}$

B. $\frac{31}{36}$

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

D. $\frac{1}{8}$

**Answer: A**

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**28.** It is know that a box of 8 batteries contains 3 defective pieces and a preson randomly selects 2 batteries form this box. Find the probability distrubtion of the number of defective batteries.

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**29.** Three balance coins are tossed simultaneoulsy. If X denotes the number of heads, find probaility distribution of X.

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**30.** 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. $\frac{3}{16}$

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

C. $\frac{4}{16}$

D. $\frac{2}{16}$

**Answer: B**

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**31.** The p.m.f. of a r.v. is

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

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

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

C. $\frac{1}{8}$

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

**Answer: A**

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**32.** The p.m.f. of a r.v. is

$$P(X=x)=\begin{cases}\frac{1}{2^5}{}^5C_x, x=0,1,\ldots,5\\ 0, \text{otherwise}\end{cases}, \text{then } P(X\geq 3)=$$

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

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

C. $\frac{1}{8}$

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

**Answer: B**

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**33.** 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. $P(X \leq 2) = 2P(X \geq 3)$

B. $P(X \leq 2) < P(X \geq 3)$

C. $P(X \leq 2) = P(X \geq 3)$

D. $P(X \leq 2) > P(X \geq 3)$

**Answer: C**

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**34.** The probability distribution of X is

Then $P(\text{X is positive})$ =

A. $0.50$

B. $0.70$

C. $0.55$

D. $0.45$

**Answer: A**

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**35.** A fair coin is tossed 4 times. If X denotes the number of heads obtained, then the formula for p.m.f. of X is

A. $f(x) = \begin{cases} \frac{1}{16}{}^4C_x, x = 0,1,2,3,4 \\ 0, \text{otherwise} \end{cases}$

B. $f(x) = \begin{cases} \frac{1}{8}{}^4C_x, x = 0,1,2,3,4 \\ 0, \text{otherwise} \end{cases}$

C. $f(x) = \begin{cases} \frac{1}{4}{}^4C_x, x = 0,1,2,3,4 \\ 0, \text{otherwise} \end{cases}$

D. $f(x) = \begin{cases} \frac{1}{2}{}^4C_x, x = 0,1,2,3,4 \\ 0, \text{otherwise} \end{cases}$

**Answer: A**

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**36.** 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. 2

C. 3

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

**Answer: D**

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**37.** 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 $P(X<1)$=

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

B. $\frac{8}{9}$

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

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

**Answer: A**

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**38.** 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 $P(0 < X < 3)$

=

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

B. $\frac{8}{9}$

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

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

**Answer: B**

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**39.** 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 c.d.f. F (X) is

A. 

B. 

C. 

D. 

**Answer: C**

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**40.** The p.m.f. of a r.v. X is $P(x) = \begin{cases} \frac{3-x}{10}, x = -1,0,1,2 \\ 0, \text{otherwise} \end{cases}$ then E (X) =

A. $0.4$

B. $-0.4$

C. 0

D. $-0.2$

**Answer: C**

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**41.** 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. $\frac{49}{36}$

B. $\frac{98}{251}$

C. $\frac{216}{251}$

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

**Answer: D**

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**42.** The expected value of the number of heads obtained when three coins are tossed simultaneously is .....

A. 1

B. $1.5$

C. 0

D. $-1$

**Answer: B**

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**43.** 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. Rs. 9

B. Rs. 3

C. Rs. 8

D. Rs. 2

**Answer: B**

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**44.** If X denotes the number obtained on the uppermost face when a fair die is thrown, then E (X) =

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

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

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

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

**Answer: B**

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**45.** The expected value of the sum of the two numbers obtained when two fair dice are rolled is

A. 7

B. 14

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

D. $\frac{50}{9}$

**Answer: A**

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**46.** A bakerman sells 5 types of cakes. Profit due to the sale of each type of cake is respectively Rs3, Rs 2.5, Rs 2, Rs 1.5, Rs 1. The demands for these cakes are $10\%, 5\%, 25\%, 45\%$ and $15\%$ respectively.. What is he expected profit per cake?

A. Rs. 1.275

B. Rs. 1.725

C. Rs. 2.275

D. Rs. 2.725

**Answer: B**

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**47.** Two cards are drawn at random from a box which contains 5 cards numbered 1, 1, 2, 2 and 3. If X denotes the sum of the numbers, then the expected sum is

A. $3.75$

B. $4$

C. $1.8$

D. $2$

**Answer: A**

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**48.** A r.v. X assumes values 1, 2, 3, ..., n with equal probabilities.

If Var (X) = 4 E (X), then n =

A. 49

B. 23

C. 25

D. 24

**Answer: C**

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**49.** A r.v. X assumes values 1, 2, 3, ..., n with equal probabilities.

If Var (X) = E (X), then n =

A. 11

B. 5

C. 6

D. 7

**Answer: D**

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**50.** 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. $\frac{2n+1}{3}$

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

C. $\frac{2n+1}{6}$

D. $\frac{n+2}{6}$

**Answer: A**

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**51.** 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 Var (X) =

A. $\frac{(n+2)(n-1)}{3}$

B. $\frac{(n+2)(n-1)}{18}$

C. $\frac{(n-2)(n+1)}{3}$

D. $\frac{(n-2)(n+1)}{18}$

**Answer: B**

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**52.** 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. $\frac{1}{5}$

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

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

**Answer: D**

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

A. $\frac{7}{3}$

B. $\frac{14}{3}$

C. $\frac{7}{6}$

D. $\frac{49}{9}$

**Answer: A**

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

A. $\frac{25}{81}$

B. $\frac{25}{36}$

C. $\frac{5}{9}$

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

**Answer: C**

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**55.** If X denotes the number obtained on the uppermost face when a fair die is thrown, then E (X) =

A. $\frac{49}{4}$

B. $\frac{70}{12}$

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

D. $\frac{35}{12}$

**Answer: C**

Watch Video Solution

**56.** If X denotes the number obtained on the uppermost face when a fair die is thrown, then Var (X) =

A. $\frac{49}{4}$

B. $\frac{70}{12}$

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

D. $\frac{35}{12}$

**Answer: D**

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**57.** 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. $\frac{10}{3}$

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

C. $\frac{100}{3}$

D. $\frac{50}{3}$

**Answer: A**

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**58.** 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 Var (X) =

A. $\frac{13}{45}$

B. $\frac{31}{45}$

C. $\frac{127}{15}$

D. $\frac{227}{15}$

**Answer: B**

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

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

B. $\frac{1}{12}$

C. $0.3$

D. $0.12$

**Answer: B**

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

A. $\frac{7}{6}$

B. $\frac{3}{7}$

C. $\frac{7}{3}$

D. $\frac{14}{3}$

**Answer: C**

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

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

B. $\frac{25}{9}$

C. $\frac{5}{18}$

D. $\frac{5}{9}$

**Answer: D**

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**62.** 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 E (X) =

A. $\frac{1}{8}$

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

C. 8

D. 6

**Answer: C**

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**63.** 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. $\frac{248}{3}$

B. $\frac{28}{3}$

C. $\frac{224}{3}$

D. $\frac{56}{3}$

**Answer: D**

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**64.** A players tosses 2 fair coins. He wins Rs. 5 if 2 heads appear, Rs. 2 if 1 head appear and Rs. 1 if no head appears. Then his expected wining amount is

A. Rs. 1.25

B. Rs. 2.15

C. Rs. 2.5

D. Rs. 2.25

**Answer: C**

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**65.** A player tosses 2 fair coins. He wins Rs. 5 if 2 heads appear, Rs. 2 if 1 head appear and Rs. 1 if no head appears, then variance of his winning amount is

A. Rs. 1.25

B. Rs. 2.15

C. Rs. 2.5

D. Rs. 2.25

**Answer: D**

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**66.** For the p.m.f. P (X = x) of discrete random variable X which takes values 1, 2, 3, 4 such that

$2P(X=1)=3P(X=2)=P(X=3)=4P(X=4)$,

then E (X)=

A. $\frac{31}{5}$

B. $\frac{62}{5}$

C. $\frac{31}{25}$

D. $\frac{62}{25}$

**Answer: D**

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**67.** The p.d.f. of continuous r.v. X is

$f(x)=\begin{cases}\frac{x}{8}, 0<x<4\\ 0, \text{otherwise}\end{cases}$, then $P(X\leq 2)$ =

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

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

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

D. $\frac{1}{8}$

**Answer: A**

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**68.** The p.d.f. of continuous r.v. X is

$f(x) = \begin{cases} \frac{x}{8}, 0 < x < 4 \\ 0, \text{otherwise} \end{cases}$, then $P(2 < X \leq 3)$ =

A. $\frac{9}{16}$

B. $\frac{5}{16}$

C. $\frac{4}{16}$

D. $\frac{13}{16}$

**Answer: B**

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**69.** The p.d.f. of continuous r.v. X is

$$f(x) = \begin{cases} \frac{x}{8}, 0 < x < 4 \\ 0, \text{otherwise} \end{cases}, \text{then } P(X > 3) =$$

A. $\frac{6}{16}$

B. $\frac{9}{16}$

C. $\frac{7}{16}$

D. $\frac{5}{16}$

**Answer: C**

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**70.** It is known that error in experiment of reaction temperature $(\text{in } {}^{\circ}\text{C})$ in a certain experiment is a continuous r.v. (X).

If $f(x) = \begin{cases} \frac{x^2}{3}, -1 < x < 2 \\ 0, \text{otherwise} \end{cases}$, then

A. f (x) is not p.f.

B. f (x) is the p.f.

C. f (x) is not p.d.f.

D. f(x) is the p.d.f.

**Answer: D**

Watch Video Solution

**71.** It is known that error in experiment of reaction temperature $(\text{in } {}^{\circ}\text{C})$ in a certain experiment is a continuous r.v. (X).

If $f(x) = \begin{cases} \frac{x^2}{3}, -1 < x < 2 \\ 0, \text{otherwise} \end{cases}$, then $P(0 < X \leq 1)$ =

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

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

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

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

**Answer: A**

Watch Video Solution

**72.** It is known that error in experiment of reaction temperature $(\text{in } {}^{\circ}\text{C})$ in a certain experiment is a continuous r.v. (X).

If $f(x) = \begin{cases} \frac{x^2}{3}, -1 < x < 2 \\ 0, \text{otherwise} \end{cases}$, then P (X is negative) =

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

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

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

D. $\frac{-1}{9}$

**Answer: B**

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**73.** If $f(x) = \left\{\left(\frac{x}{2}, \text{for } -2 < x < 2\right). (0, \text{otherwise}\right)$, then

A. f is a p.f.

B. f is not a p.f.

C. f is a p.d.f.

D. f is not a p.d.f.

**Answer: C**

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**74.** If $f(x) = \begin{cases} e^{-x}, 0 < x < \infty \\ 0, \text{otherwise} \end{cases}$, then

A. f is a p.f.

B. f is not a p.f.

C. f is a p.d.f.

D. f is not a p.d.f.

**Answer: B,C**

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**75.** The p.d.f. of a r.v. X is $f(x) = \begin{cases} \frac{1}{x^2}, 1 < x < \infty \\ 0, \text{otherwise} \end{cases}$. If $C_1 = \{x : 1 < x < 2\}$ and $C_2 = \{x : 4 < x < 5\}$, then $P(C_1 \cup C_2)$ =

A. $\frac{11}{10}$

B. $\frac{11}{20}$

C. $\frac{1}{10}$

D. $\frac{1}{20}$

**Answer: B**

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**76.** The p.d.f. of a continuous r.v. X is

$f(x) = \begin{cases} \frac{x^2}{3}, -1 < x < 2 \\ 0, \text{otherwise} \end{cases}$, then F (x) =

A. $\frac{x^3}{9} + \frac{1}{9}, \forall x \in R$

B. $\frac{x^3}{9} - \frac{1}{9}, \forall x \in R$

C. $\frac{x^2}{4} + \frac{1}{4}, \forall x \in R$

D. $\frac{1}{9x^3} + \frac{1}{9}, \forall x \in R$

**Answer: A**

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**77.** The p.d.f. of a continuous r.v. X is

$$f(x) = \begin{cases} \frac{x^2}{3}, -1 < x < 2 \\ 0, \text{otherwise} \end{cases}, \text{then } P(X < 1) =$$

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

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

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

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

**Answer: C**

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**78.** The p.d.f. of a continuous r.v. X is

$$f(x) = \begin{cases} \frac{x^2}{3}, -1 < x < 2 \\ 0, \text{otherwise} \end{cases}, \text{then } P(X \leq -2) =$$

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

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

C. 1

D. 0

**Answer: D**

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**79.** The p.d.f. of a continuous r.v. X is $f(x) = \begin{cases} \frac{x^2}{3}, -1 < x < 2 \\ 0, \text{otherwise} \end{cases}$, then $P(X > 0)$ =

A. $\frac{8}{9}$

B. $\frac{5}{9}$

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

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

**Answer: A**

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**80.** The p.d.f. of a continuous r.v. X is $f(x) = \begin{cases} \frac{x^2}{3}, -1 < x < 2 \\ 0, \text{otherwise} \end{cases}$, then $P(1 < X < 2)$ =

A. $\frac{8}{9}$

B. $\frac{7}{9}$

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

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

**Answer: B**

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**81.** 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. $\frac{7}{27}$

B. $\frac{14}{27}$

C. $\frac{9}{14}$

D. $\frac{7}{14}$

**Answer: B**

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**82.** 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. $\frac{1}{3}$

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

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

D. $\frac{1}{54}$

**Answer: C**

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**83.** The p.d.f. of a continuous r.v. X is $f(x) = \begin{cases} \frac{1}{10}, -5 \leq x \leq 5 \\ 0, \text{otherwise} \end{cases}$, then $P(X < 0)$ =

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

B. $\frac{1}{10}$

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

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

**Answer: A**

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**84.** Let X = time (in minutes) that elapses between the bell and the end of the lecture in case of a college professor. If X has p.d.f. $f(x) = \begin{cases} kx^2, 0 \leq x \leq 2 \\ 0, \text{otherwise} \end{cases}$, then k =

A. $\frac{8}{3}$

B. $\frac{3}{8}$

C. $\frac{4}{3}$

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

**Answer: B**

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**85.** Let X = time (in minutes ) that lapses between the bell and the end of the lectures in cases of a collge professor. Suppose X has p.d.f

$$f(x) = \begin{cases} kx^2 & 0 \leq x \leq 2 \\ 0 & \text{otherwise} \end{cases}$$

What is the probability that lecture ends within 1 minute of the bell ringing ?

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

B. $\frac{3}{4}$

C. $\frac{1}{8}$

D. $\frac{3}{8}$

**Answer: C**

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**86.** Let the random variable X is defined as time (in minutes) that elapses between the bell and end of the lecture in case of collagen professor whrer pdf is defined as $f(x) = \begin{cases} kx^2, 0 \leq x < 2 \\ 0, \quad \text{elsewhere} \end{cases}$ find the probability that lecture continue for atleast 90s beyond the bell

A. $\frac{37}{192}$

B. $\frac{37}{32}$

C. $\frac{37}{24}$

D. $\frac{37}{64}$

**Answer: D**

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**87.** 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. $\frac{x-2}{x}$

B. $\frac{2-x}{x}$

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

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

**Answer: C**

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**88.** The p.d.f. of a r.v. X is $f(x) = \begin{cases} kx, 0 < x < 2 \\ 0, \text{otherwise} \end{cases}$, then k =

A. 4

B. 2

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

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

**Answer: D**

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**89.** The p.d.f. of a r.v. X is $f(x) = \begin{cases} kx, 0 < x < 2 \\ 0, \text{otherwise} \end{cases}$, then $P\left(\frac{1}{4} < X < \frac{1}{3}\right)$=

A. $\frac{7}{576}$

B. $\frac{7}{144}$

C. $\frac{7}{288}$

D. $\frac{25}{576}$

**Answer: A**

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

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

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

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

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

**Answer: D**

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**91.** 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. $\frac{2}{9}$

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

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

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

**Answer: A**

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**92.** The p.d.f. of a continuous r.v. X is $f(x) = \begin{cases} \frac{x}{8}, & 0 < x < 4 \\ 0, \text{otherwise} \end{cases}$, then F (x) =

A. $F(x) = \frac{x^2}{8}, x \in R$

B. $F(x) = \frac{x^2}{16}, x \in R$

C. $F(x) = 8x^2, x \in R$

D. $F(x) = 16x^2, x \in R$

**Answer: B**

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**93.** The p.d.f. of a continuous r.v. X is $f(x) = \begin{cases} \frac{x}{8}, 0 < x < 4 \\ 0, \text{otherwise} \end{cases}$,

then F (0.5) =

A. $\frac{0.25}{64}$

B. $\frac{0.25}{32}$

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

D. $\frac{1}{32}$

**Answer: C**

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**94.** The p.d.f. of a continuous r.v. X is $f(x) = \begin{cases} \frac{x}{8}, 0 < x < 4 \\ 0, \text{otherwise} \end{cases}$,

then F (1.7) =

A. $\frac{1}{32}$

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

C. $\frac{2.89}{32}$

D. $\frac{2.89}{16}$

**Answer: D**

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**95.** The p.d.f. of a continuous r.v. X is $f(x) = \begin{cases} \frac{x}{8}, 0 < x < 4 \\ 0, \text{otherwise} \end{cases}$,

then F (5) =

A. 1

B. 0

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

D. $\frac{25}{32}$

**Answer: C**

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**96.** The p.d.f. of a r.v. X is $f(x) = \begin{cases} 2x, & 0 \leq x \leq 1 \\ 0, & \text{otherwise} \end{cases}$, then $P\left(\frac{1}{3} < X < \frac{1}{2}\right)$=

A. $\frac{5}{18}$

B. $\frac{13}{18}$

C. $\frac{5}{36}$

D. $\frac{13}{36}$

**Answer: C**

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**97.** The p.d.f. of a r.v. X is $f(x) = \begin{cases} 0.5x, 0 < x < 2 \\ 0, \text{otherwise} \end{cases}$, then $P(X \leq 1)$ =

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

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

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

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

**Answer: B**

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**98.** The p.d.f. of a r.v. X is $f(x) = \begin{cases} 0.5x, & 0 < x < 2 \\ 0, \text{otherwise} \end{cases}$, then $P(0.5 \leq X \leq 1.5)$ =

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

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

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

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

**Answer: C**

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**99.** The p.d.f. of a r.v. X is $f(x) = \begin{cases} 0.5x, & 0 < x < 2 \\ 0, \text{otherwise} \end{cases}$, then $P(X > 1.5)$ =

A. $0.3476$

B. $0.4376$

C. $0.3475$

D. $0.4375$

**Answer: D**

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**100.** The p.d.f. of a r.v. X is $f(x) = \begin{cases} kx^2(1-x), 0 < x < 1 \\ 0, \text{otherwise} \end{cases}$,

then k =

A. 12

B. 1

C. $\frac{1}{12}$

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

**Answer: A**

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**101.** The p.d.f. of a r.v. X is $f(x) = \begin{cases} ke^{-\theta x}, 0 \leq x < \infty \\ 0, \text{otherwise} \end{cases}$, then k =

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

B. $\frac{1}{20}$

C. $\theta$

D. 1

**Answer: C**

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**102.** The p.d.f. of a r.v. X is $f(x) = \begin{cases} ke^{-\theta x}, 0 \leq x < \infty \\ 0, \text{otherwise} \end{cases}$, then $P\left(X > \frac{1}{\theta}\right)$ =

A. 2e

B. e

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

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

**Answer: D**

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**103.** The p.d.f. of a r.v. X is $f(x) = \begin{cases} ke^{-\theta x}, 0 \leq x < \infty \\ 0, \text{otherwise} \end{cases}$, then $P(0 < X < M) = \frac{1}{2}$, if M =

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

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

C. $\log 2$

D. $2\log 2$

**Answer: A**

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**104.** The p.d.f. of a r.v. X is $f_X(x) = \begin{cases} kx(1-x), 0 < X < 1 \\ 0, \text{otherwise} \end{cases}$,

then k =

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

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

C. 3

D. 6

**Answer: D**

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**105.** The p.d.f. of a r.v. X is $f_X(x) = \begin{cases} kx(1-x), 0 < X < 1 \\ 0, \text{otherwise} \end{cases}$, then $P\left(X < \frac{1}{2}\right)$ =

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

B. $\frac{1}{12}$

C. $\frac{1}{8}$

D. $\frac{1}{24}$

**Answer: A**

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**106.** The p.d.f. of a r.v. X is $f_X(x) = \begin{cases} kx(1-x), 0 < X < 1 \\ 0, \text{otherwise} \end{cases}$, then $P\left(\frac{1}{4} < X < \frac{1}{2}\right)$ =

A. $\frac{11}{16}$

B. $\frac{11}{32}$

C. $\frac{11}{64}$

D. $\frac{11}{192}$

**Answer: B**

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**107.** The p.d.f. of a r.v. X is $f(x) = \begin{cases} 3(1-2x^2), 0 < x < 1 \\ 0, \text{otherwise} \end{cases}$,

then F (x) =

A. $\frac{2x^3 - 3x}{3}$

B. $\frac{3x - 2x^3}{3}$

C. $2x^3 - 3x$

D. $3x - 2x^3$

**Answer: D**

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**108.** The p.d.f. of a r.v. X is $f(x) = \begin{cases} 3(1-2x^2), 0 < x < 1 \\ 0, \text{otherwise} \end{cases}$, then $P\left(\frac{1}{4} < x < \frac{1}{3}\right)$ =

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

B. $\frac{179}{432}$

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

D. $\frac{179}{2592}$

**Answer: A**

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**109.** The p.d.f. of a r.v. X is $f_X(x) = \begin{cases} \frac{k}{\sqrt{x}}, 0 < x < 4 \\ 0, \text{otherwise} \end{cases}$, then k =

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

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

C. 2

D. 4

**Answer: B**

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**110.** The p.d.f. of a r.v. X is $f_X(x) = \begin{cases} \frac{k}{\sqrt{x}}, 0 < x < 4 \\ 0, \text{otherwise} \end{cases}$, then c.d.f. of X is

A. $\sqrt{x}$

B. $2\sqrt{x}$

C. $\frac{\sqrt{x}}{2}$

D. $\sqrt{\frac{x}{2}}$

**Answer: C**

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**111.** The p.d.f. of a r.v. X is $f_X(x) = \begin{cases} \frac{k}{\sqrt{x}}, 0 < x < 4 \\ 0, \text{otherwise} \end{cases}$, then $P(X \leq 2)$ =

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

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

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

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

**Answer: D**

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**112.** The p.d.f. of a r.v. X is $f_X(x) = \begin{cases} \frac{k}{\sqrt{x}}, 0 < x < 4 \\ 0, \text{otherwise} \end{cases}$, then

$P(2 < X < 3)$ =

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

B. $\frac{\sqrt{3} - \sqrt{2}}{4}$

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

D. $\frac{\sqrt{2} - \sqrt{3}}{4}$

**Answer: A**

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**113.** The p.d.f. of a r.v. X is $f_X(x) = \begin{cases} \frac{k}{\sqrt{x}}, 0 < x < 4 \\ 0, \text{otherwise} \end{cases}$, then

$P(X \geq 1)$ =

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

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

C. $\frac{3}{4}$

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

**Answer: B**

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**114.** The p.d.f. of a continuous r.v. X is

$f(x) = \begin{cases} \frac{1}{2a}, 0 < x < 2a, (a > 0) \\ 0, \text{otherwise} \end{cases}$, then $P\left(X < \frac{a}{2}\right)$ =

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

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

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

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

**Answer: C**

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**115.** The p.d.f. of a continuous r.v. X is

$f(x) = \begin{cases} \frac{1}{2a}, 0 < x < 2a, (a > 0) \\ 0, \text{otherwise} \end{cases}$, then $P\left(X > \frac{3a}{2}\right)$ =

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

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

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

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

**Answer: D**

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**116.** The p.d.f. of a continuous r.v. X is

$$f(x) = \begin{cases} \frac{1}{2a}, 0 < x < 2a, (a > 0) \\ 0, \text{otherwise} \end{cases}$$ , then

A. $P\left(X < \frac{a}{2}\right) = P\left(X > \frac{3a}{2}\right)$

B. $P\left(X < \frac{a}{2}\right) < P\left(X > \frac{3a}{2}\right)$

C. $P\left(X < \frac{a}{2}\right) > P\left(X > \frac{3a}{2}\right)$

D. $P\left(X < \frac{a}{2}\right) = 2P\left(X > \frac{3a}{2}\right)$

**Answer: A**

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**117.** Suppose r.v. X = waiting time in minutes for a bus and its p.d.f. is given by $f(x) = \begin{cases} \frac{1}{5}, 0 \leq x \leq 5 \\ 0, \text{otherwise} \end{cases}$, then probability that waiting time is between 1 and 3 minutes is

A. $\frac{4}{5}$

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

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

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

**Answer: B**

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**118.** Suppose r.v. X = waiting time in minutes for a bus and its p.d.f. is given by $f(x) = \begin{cases} \frac{1}{5}, 0 \leq x \leq 5 \\ 0, \text{otherwise} \end{cases}$, then probability that waiting time is more than 4 minutes is

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

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

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

D. $\frac{4}{5}$

**Answer: C**

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**119.** If a random variable waiting time in minutes for bus and probability density function of x is given by

$$f(x) = \begin{cases} \frac{1}{5}, 0 \leq x \leq 5 \\ 0, \text{otherwise} \end{cases}$$

Then probability of waiting time not more than 4 minutes is equal to

A. $0.3$

B. $0.8$

C. $0.2$

D. $0.5$

**Answer: B**

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**120.** The p.d.f. of a continuous r.v. X is

$$f(x) = \begin{cases} k(4 - x^2), -2 \leq x \leq 2 \\ 0, \text{otherwise} \end{cases}$$ , then k =

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

B. $\frac{3}{16}$

C. $\frac{1}{32}$

D. $\frac{3}{32}$

**Answer: D**

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**121.** The p.d.f. of a continuous r.v. X is $f(x) = \begin{cases} k(4-x^2), -2 \leq x \leq 2 \\ 0, \text{otherwise} \end{cases}$, then $P(X > 0)$ =

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

B. $\frac{3}{8}$

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

D. $\frac{3}{16}$

**Answer: A**

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**122.** The p.d.f. of a continuous r.v. X is

$f(x) = \begin{cases} k(4 - x^2), -2 \leq x \leq 2 \\ 0, \text{otherwise} \end{cases}$, then $P(-1 < X < 1)$

=

A. $\frac{11}{32}$

B. $\frac{11}{16}$

C. $\frac{11}{48}$

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

**Answer: B**

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**123.** The p.d.f. of a continuous r.v. X is $f(x) = \begin{cases} k(4 - x^2), -2 \leq x \leq 2 \\ 0, \text{otherwise} \end{cases}$, then $P(X < -0.5 \text{ or } X > 0.5) =$

A. $\frac{9}{132}$

B. $\frac{9}{66}$

C. $\frac{81}{128}$

D. $\frac{27}{64}$

**Answer: C**

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**124.** The time (in minutes) for a lab assistant to prepare the equipment for a certain experiment is a random variable taking values between 25 and 35 minutes with p.d.f. $f(x) = \begin{cases} \frac{1}{10}, 25 \leq x \leq 35 \\ 0, \text{otherwise} \end{cases}$, then the probability that preparation time exceeds 33 minutes is

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

B. $\frac{1}{10}$

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

D. $\frac{3}{10}$

**Answer: A**

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**125.** The time (in minutes) for a lab assistant to prepare the equipment for a certain experiment is a random variable taking values between 25 and 35 minutes with p.d.f. $f(x) = \begin{cases} \frac{1}{10}, 25 \leq x \leq 35 \\ 0, \text{otherwise} \end{cases}$, then F (x) =

A. $\frac{25 - x}{10}$

B. $\frac{x - 25}{10}$

C. $\frac{25 - x}{5}$

D. $\frac{x - 25}{5}$

**Answer: B**

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**126.** A boy tosses faiir coin 3 times. If he gets Rs 2X for X heads, then his expected gain equals to Rs.....

A. 1

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

C. 3

D. 4

**Answer: C**

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**127.** A box contains 6 pens , 2 of which are defective Two pens are taken randomy from the bax .If r,v. X., : Number of defective pens obtained , then standard deviation of x=

A. $\pm \frac{4}{3\sqrt{5}}$

B. $\frac{8}{3}$

C. $\frac{16}{45}$

D. $\frac{4}{3\sqrt{5}}$

**Answer: D**

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