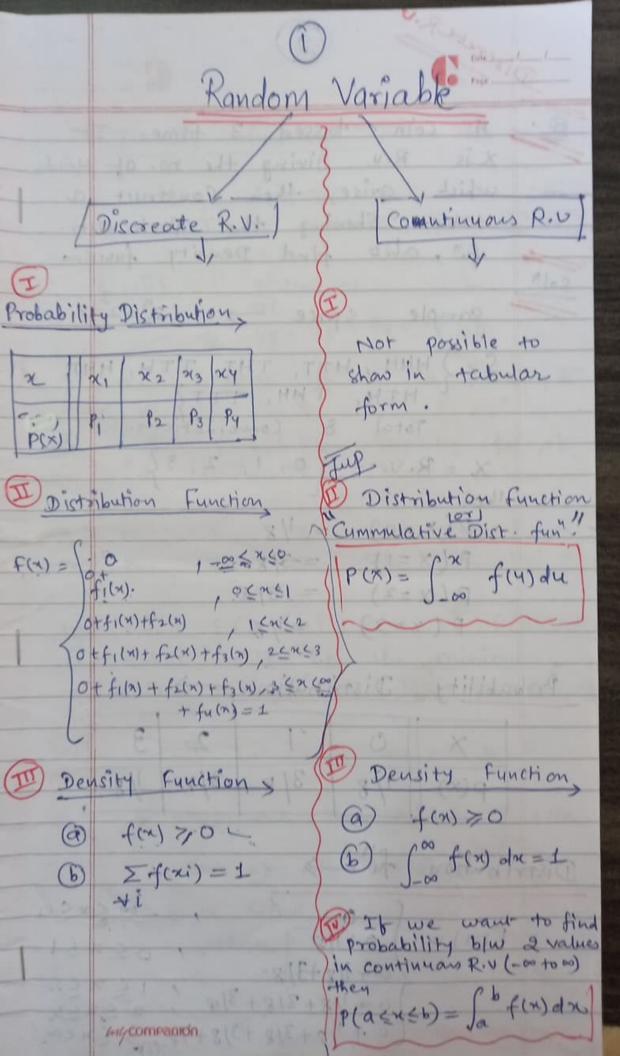
Random Variable Page * Sample Space > A Set S that consists of all possible outcomes of a random experiment one is called "Sample Space". Example If we have a coin then Sample Space $S = \SH, T \S$. *Random Variable > A real valued function defined on a sample Space is called "Random variable". It is denoted by X ory. Example: -> Suppose that a coin is tossed twice So that Sample Space, Sample Space-S = {HH, TT, HT, TH} outcome is H So, Random Variable X = {0,1,2}



Discrete R.O Q. A coin tossed 3 times. It X is R.v. giving the no. of Head which arise, then Construct a table Showing the Prob. distr. fur, also find Density function

Pen ____

Sample space $\Rightarrow 2^n = 2 = 8$

 $X = R.V. = \{0, 1, 2, 3\}$ then

P(x=0) = 1/8

P (X=1) = 3/8

= 3/8. P(X=2)

=1/8 b(x=3)

Distribution -> Probability

X	0		2	3	
p(x)	1/8	3/8	3/8	1/8	1

Distribution fu"->

Sol

1 -00 EXCO 0 F(x) = 0+11.8 0.+1/8+3/8 1 0 Ex 51 0+1/8+3/8+3/8 / 1-EXCX

0 + 1/8+3/8+3/8+1/8. D3 Exco. ungcompanion



Density function It is obvious that full is f(n) >, 0. ∑f(70) =1 => 1/8+3/8+3/8+1/8=1 Then given full is a Density by. probability Density fun of Variate (R.v.) X 1s X: 0 1 2 3 4 5 6 P(x): K 3K 5K 7K 9K 11K 13K @ Find P(x 24), P(x7,5), P(3<x6) (b) what will be the minimum value of K so that P(X <2)703 5019 Ist we will find K= } Ep(xi) = K+3K+5K+7K+9K+11K i=1 + 13K Sum of all Probabilities = 1 then, 1 = 49 K then [K = 1]

Mycompanion

(a) P(x <4) = K+3K+5K+7

= 16K since, K= 49

 $= 16 \times \frac{1}{49} = \frac{16}{49}$

(3) P(X75) = 11 + 13K = 24K

= 24 X 1/49

= 24

P(3(x26) = 9 K+ 11 K+13K = 33K

= 33 × 49

(b) $P(X \le 2) > 0.3$

K+3K+5K >0.3

9K > 0.3 then K7 0.3

Parana Cara Cara

They theo minimum value K is => | K7/30 06

Mycompanion

Date ___/__/ @. Find the constant C such that the fu" f(x) = Cx2, 0 < x <3 is a Density fun.

(b) compute (1/x/2)

(c) cymmulative Dist. fun, Soly ("In continuous fu" Question is always in the form of interval.") a) for Density fun . Jer we will find c= ? for this,

\[
\int_{-\infty} f(n) dx = 1
\]

\[
\int_{-\infty} f(n) dn = 1
\]

Break in the fine subjutervals $\int_{-\infty}^{\infty} dx + \int_{0}^{3} f(x) dx + \int_{3}^{\infty} f(x) dx = 1$ 0 + 13 cx dx + 0 = 1 $c(x^3)^3 = 1$ Since, C = 1/9Since, C = 1/9is clear that f(x) > 0So given for is Density for f(x) = 1/9-fun.

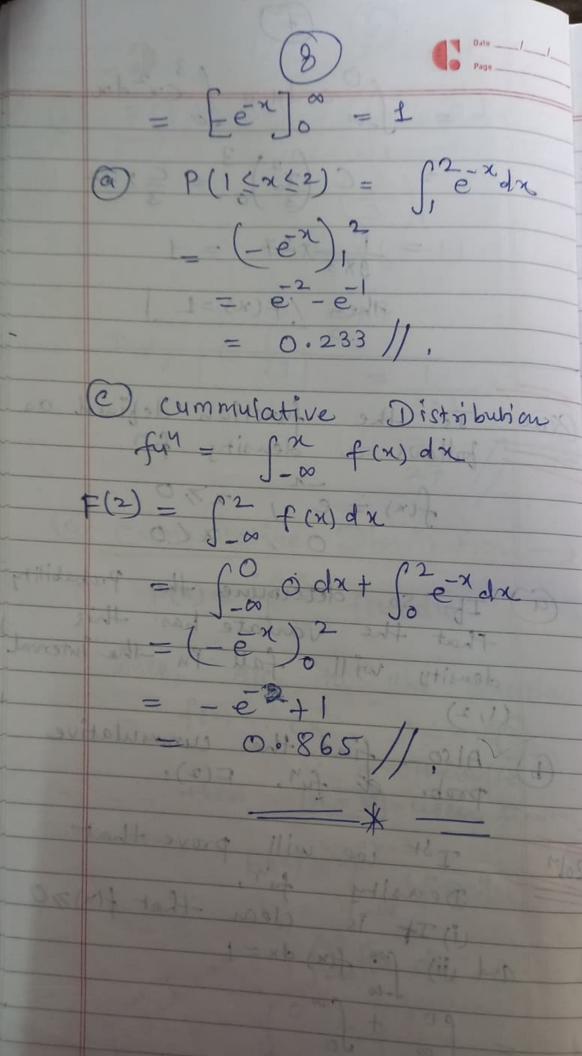
6 (b) P(1(x (2)) = \(\frac{2}{x}\) dx $= C \left(\frac{2^3}{3}\right)^2$ $=\frac{c}{3}\times(8-1)$ $= \frac{c}{3} \times 7$ $\begin{array}{c|c} \text{Put}, & C=1/9 \\ \hline & 9\times3 \\ \end{array} = \begin{array}{c} 1 \\ \hline & 9\times3 \\ \end{array} \times 7 \end{array}$ @ Cymmulative Distribution $F(x) = \int_{-\infty}^{x} f(u) du$ Since, A/C to the Question $f(x) = cx^2, \quad o < x < 3$ then [x=3] = upper limit then, $F(x) = \int_{-\infty}^{\infty} x=3$ real subjection CO $\frac{1}{2} = \int_{-\infty}^{\infty} + \int_{0}^{3}$

= 500 du + 50 cx2dx $= C(x^2)^3 = 5x27$ $=\frac{1}{9\times3}\times27=1$ then /F(x)=L) Que Is the function defined as follows a density fun f(x) = e , x7,0 0, x60a) It so determine the Probability that the variate has this density will fall In the interval

(112)

Also find the cummulative

prob. of fur. F(2). Ist we will prove that COLM Density fun, (i) It is clear that f(m) 7,0 and (ii) for f(x) dx = 1 $=\int_{-\infty}^{0}+\int_{0}^{\infty}$ Excompenent to exdx = I

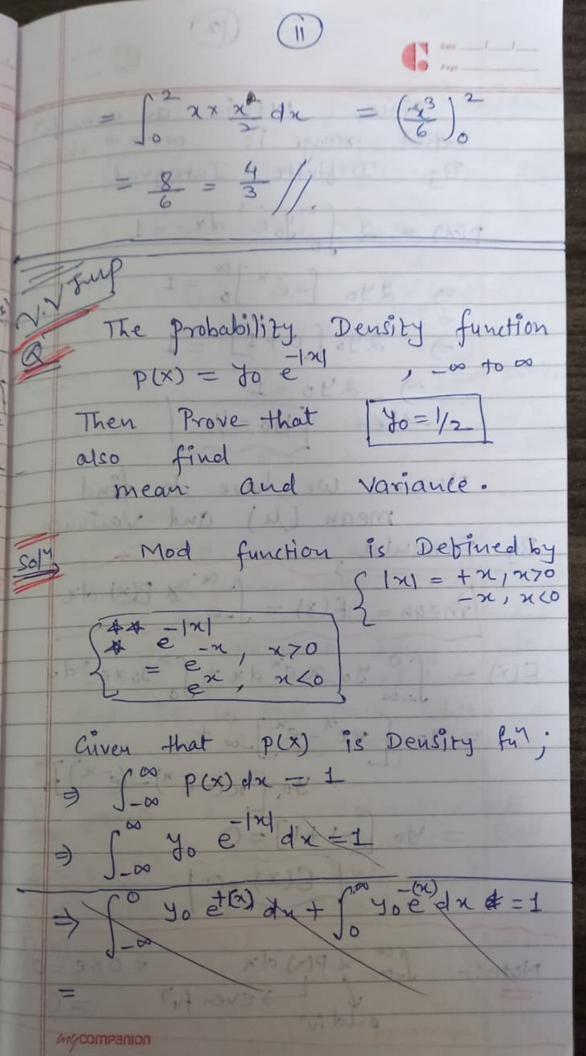


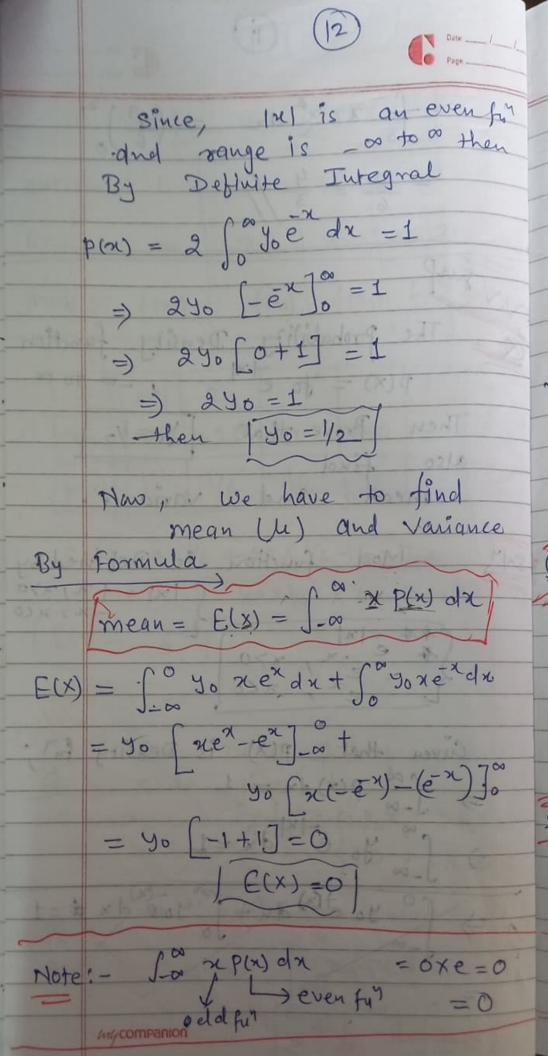
E(X) Mathematical Expectation Discrete R.V. Continuous R.V 2 | X1 | X2 | X3 | MY P(X) | P1. | P2 | P3 | P4 uncountable $E(x) = \int_{-\infty}^{\infty} f(x) dx$ E(X)= x1P,+ x2P2+ expectation X3P3+ X4P4 Tt is also known as "Expectation".

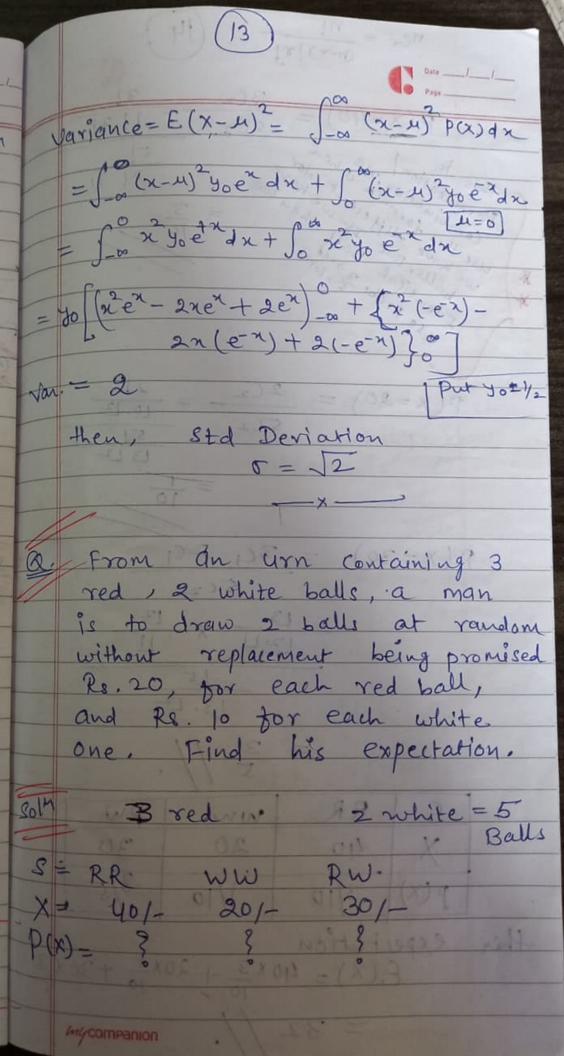
BOD Discrete v
Suppose that a game is to be played with a single die assumed fair. In this game a player wins \$. 20, 16 2 turns up, \$ 4016 4 turns up, loses 9 30 if 6 turns up, while the player neither wing nor losses it any other face turns up. Find the expected sym of money to be won. Sol" Let X be the RN. Giving the amount of money won on any toss. The possible amounts won when the die Mycompanion



			4	O fist
.010	turns	up. 740	Tathern	1001
outcor	mes: 1		4	
RIV:	3 24	7(2 2	(3 24	25 26
prob	f(n1)	f(n2)	f(n3) f(ny) fins fins
S	1 2	3	4 5	67
xi	0 +2	0 0	+40 C	-30
· Ifc	xi) 16 11	6 16	16 4	6 1/6
E	x) = 0x 1/6 -		The same of the same of	- (-30)x 1/6
E(x)	A .	and site	AT LOS	
Huy	N S OF P.	and sa	d largh	1
(D. D.	The I	ensity fr	a of c	R.V.
James J.	5+159×5 5	$f(x) = \frac{1}{2}$	1/2×,	O (Y (2) Therise
Jan II	Find E	(x) .	X 351	190
Solm	E(x)	= 000	ifindn	11.
	Mycompanion	= J-0+	$\int_0^2 + \int$	2







$$P(X=40) = \frac{3(2}{5(2)} = \frac{3!}{12!}$$

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$$P(X=40) = \frac{3(2)}{5(2)} = \frac{3!}{2! \cdot 3!}$$

$$P(X=30) = \frac{3(2)}{5(2)} = \frac{2!}{2! \cdot 3!}$$

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$$P(X=30) = \frac{3(2)}{5(2)} = \frac{2!}{10}$$

$$P(X=30) = \frac{3(1) \cdot 2(1)}{5(2)}$$

$$P(X=30) = \frac{$$

(15)

1 ans __!__!__

R.v. I in the range (-3,13) is defined as

 $f(x) = \frac{1}{16} (3+x)^2, -3 \le x \le -1$ $= \frac{1}{16} (6-2x^2), -1 \le x \le 1$ $= \frac{1}{16} (3-x^2), 1 \le x \le 3$

Verify that the drea under the curve is unity. Show that the mean is O.

X A rea under the curve; —

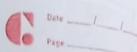
= $\frac{1}{16} \int_{-3}^{-1} (x+3)^2 dx + \frac{1}{16} \int_{-1}^{1} \frac{(x+3)^2}{6-2x^2} dx$ + $\frac{1}{16} \int_{-3}^{3} (3-x^2)^2 dx$ = $\frac{1}{16} \times 16 = 1$

Mean $M = \int_{16}^{1} \int_{-3}^{1} (x+3)^{2} dx$ $+ \int_{16}^{1} \int_{-1}^{3} x (2-6x)^{2} dx$ $+ \int_{16}^{3} \int_{1}^{3} x (3-1)^{2} dx$

= 0

æ





X is a random variable giving time (in min) during which a certain electrical equipment is used at max. load in a Specified time period if the Probability distribution function is given by, f(x) = 1 (1500)2 10(216)500 = - (x-3000) 1/200 < x < 3000 =0, otherwise Find the expected value of 21. $\frac{1000}{500} = \int \frac{1000}{500} \times \frac{1000}{500} = \int \frac{1000$ $= \frac{1}{(1500)^2} \left[\frac{3}{3} \right] \frac{1500}{0} \left[\frac{3}{3} \right] \frac{3000}{1500}$ $= \frac{1}{3} \frac{3000}{0} \left[\frac{3}{3} \right] \frac{3000}{0}$ = 500 - (-1000) = 1500 //