file

$C = E_1 \cap E_2'$

$D = E_1 \cap E_2$

$P(X) = C + D$

Properties
{ Associate
{ Distributive

★ Random Variables ★

- Discrete Random Variable
- Continuous Random Variable
- Expectation of Random Variable
- Variance of a random Variable.
- Jointly distributed Random Variables
- Combinations and functions of Random variables.

For each point of a Sample Space. we assign a number and define a function on the Sample Space. This function is random variable.

A numerical value to each outcome of a particular experiment

Ex 1: Machine Breakdowns.
- Sample Space: S = {electrical, mechanical, misuse}
- Each of these failures may be associated with a repair cost.
- State Space: {50, 200, 350},
- Cost is a random variable 50, 200 and 350



a pair of fair dice are tossed an let the random variable X denote the sum of points

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

Possible Sums.

$X = \{2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

$\frac{1}{36}\ \frac{2}{36}\ \frac{3}{36}\ \frac{4}{36}\ \frac{5}{36}\ \frac{6}{36}\ \frac{5}{36}\ \frac{4}{36}\ \frac{3}{36}\ \frac{2}{36}\ \frac{1}{36}$

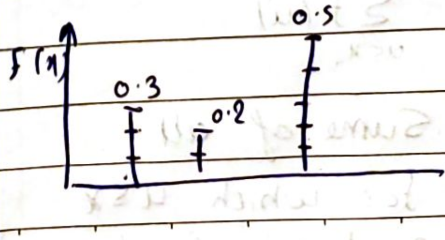
A random variable which takes on finite number of values is a discrete random variable and one which takes on non countably infinite number of values is called as continuous random variable.

6.1 5 2 4 3

★ Probability Mass Function
- A set of probability value $p_i$ assigned to each of the values taken by discrete random variable $x_i$
- $0 \le p_i$ and $\sum_i p_i = 1$
- Probability : $P(X = x_i) = p_i$

$p(cost = 50) = 0.3$
$p(cost = 200) = 0.2$
$p(cost = 350) = 0.5$
$- 0.3 + 0.2 + 0.5 = 1$

(Machine Breakdown Problem)




NIPRI

Let X be a discrete random variable and suppose that possible values which it can assume are given by $x_1, x_2$ arrange in increasing order of Magnitude. Suppose some values are also associated with probabilities given by

$$P(X = x_k) = f(x_k).$$

In general the probability function • $f(x) \geq 0$

• $\sum_x f(x) = 1.$

(Probability Function).

* Cumulative Distribution Function

$$F(x) = P(X \leq x).$$

$$F(x) = \sum_{y \leq x} P(X = y).$$

CDF for a random variable x is defined as-

$$P(X \leq x) = F(x).$$

where x is any real number

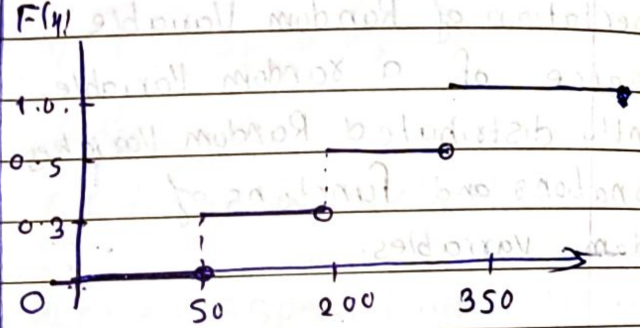
$$-\infty < x < \infty$$

The distribution function can be obtained from distribution function by noting.

$$F(x) = \sum_{u \leq x} f(u)$$

where the Sume of all values of u for which $u \leq x$ and the probabilit function can be obtained from distribution function if X taken only finite number of values. $x_1, x_2 \dots x_m$ then the distribution function is given by

$$F(x) = \begin{cases} 0 & -\infty < x < x_1 \\ f(x_1) & x_1 < x < x_2 \\ f(x_1 + x_2) & x_2 < x < x_3 \\ f(x_1 + x_2 + \dots) & x_n < x < \infty \end{cases}$$



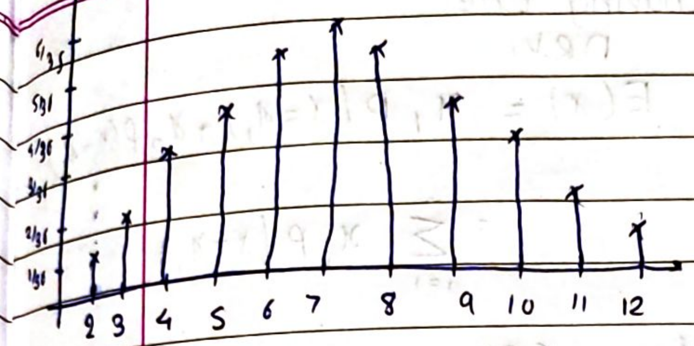

A pair of dice thrown X denotes Sum of no find CDF

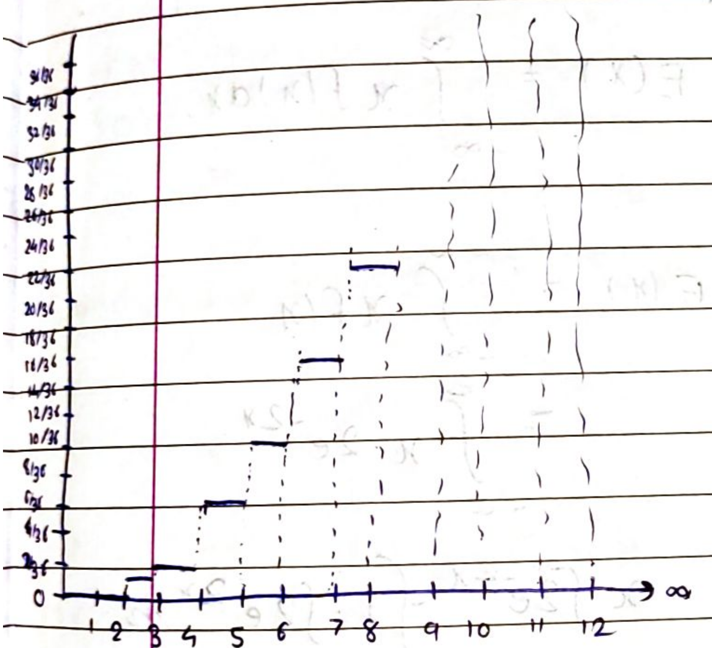
Construct graph for the distribution.

$$f(x) = \begin{cases} 0 & -\infty < x < 2 \\ 1/36 & 2 \leq x < 3 \\ 2/36 & 3 \leq x < 4 \\ 3/36 & 4 \leq x < 5 \\ 4/36 & 5 \leq x < 6 \\ 5/36 & 6 \leq x < 7 \\ 6/36 & 7 \leq x \leq 8 \\ 5/36 & 8 \leq x < 9 \\ 4/36 & 9 \leq x \leq 10 \\ 3/36 & 10 \leq x \leq 11 \\ 2/36 & 11 \leq x \leq 12 \\ 1/36 & 12 \leq x \leq \infty \end{cases}$$

file






If $x$ is a CRV and prob $x$ takes any one particular value generally 0. So we cannot define a probability function as the same way as discrete random variable.

CRV lies between two diff values A and B. The propeoties.

$f(x) \geq 0$

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

We define the probability $x$ lies beween $a$ & $b$ of

$$p(a < X < b) = \int_a^b f(x)\,dx.$$

which satisfies this properties is called probability function or probability distribution for CRV $x$ or probl desity function.

$$f(x) = \begin{cases} cx^2 & 0 < x < 3 \\ 0 & \text{otherwise} \end{cases}$$

Compute $P(1 < x < 2)$

$$P(1 < x < 2) = \int_1^2 cx^2\,dx.$$

$$= \left[\frac{cx^3}{3}\right]_1^2 = \frac{7c}{3}.$$

$$\int_{-\infty}^{\infty} f(x) = \int_{-\infty}^{0} f(x) + \int_0^3 f(x) + \int_3^{\infty} f(x)$$

$$= \left[\frac{cx^3}{3}\right]_0^3 = 1$$

$$= c \times \frac{27}{3} = 9 = 1$$

$$c = \frac{1}{9}$$

$$\boxed{p(1 < x < 2) = \frac{7}{27}}$$

Suppose that the random variable $X$ is the diameter of a randomly chosen cylinder manufactured by the company.

$f(x) = 1.5 - 6(x - 50.2)^2$

for $49.5 \le x \le 50.2$

$= 0$ otherwise.

$$\int_{49.5}^{50.5} (1.5 - 6(x - 50.2)^2)\, dx$$

$$= \left[1.5x - 2(x - 50.0)^3\right]_{49.5}^{50.5}$$

$$= \underline{\underline{1.0}}$$

⇒ It is Valid PDF.

* CDF for CRV.

$$F(x) = P(X \le x) = \int_{-\infty}^{x} f(y)\,dy$$

* A CRV $X$ has probability desity function $f(x)$ given by

$$f(x) = \begin{cases} 2e^{-2x} & x > 0 \\ 0 & x \le 0. \end{cases}$$

find $E(X)$, $E(X^2)$

The mathematical expectation of random variable $X$ having the DR.V.

$$E(X) = x_1 P(X = x_1) + x_2 P(X = x_2)$$

$$= \sum_{i=1}^{n} x_i P(X = x_i)$$

for CRV.

$$E(X) = \int_{-\infty}^{\infty} x f(x)\,dx.$$

$$E(X) = \int_{-\infty}^{\infty} x f(x)$$

$$= \int_{-\infty}^{\infty} x \cdot 2e^{-2x}.$$

$$x \cdot \int 2e^{-2x} - \int 1 \cdot \int 2e^{-2x}\,dx.$$

$$\frac{x\, 2e^{-2x}}{-2} - \int 1 \cdot \frac{2e^{-2x}}{-2}\,dx$$

$$\left[-xe^{-2x} + \frac{e^{-2x}}{-2}\right]_{0}^{\infty}$$

$E(X) = \frac{1}{2}$

$E(X^2) = \frac{1}{2}$

When the probabilities are equal.

$$E(X) = \frac{x_1 + x_2 + \dots x_n}{n}$$

$E(cX) = c \cdot E(X)$

$E(X+Y) = E(X) + E(Y)$

$E(XY) = E(X)E(Y)$

$Var(X) = E[(X-\mu)^2]$

KAIST

NJPRL

$\sigma^2 = E[(X-\mu)^2]$

for DRV :

$\sigma^2 = \sum (x-\mu)^2 \cdot f(x)$

~~$\sigma^2 = E(X-\mu)^2$~~

for CRV

$$\sigma^2 = \int_{-\infty}^{\infty} (X-\mu)^2 f(x)\,dx$$

* $Var(cX) = c^2 Var(X)$
* $Var(X+Y) = Var(X) + Var(Y)$

Standardized Random Variable

$$X^* = \frac{X-\mu}{\sigma}$$

The expected diameter of a metal cylinder

$$E(X) = \int_{49.5}^{50.5} x(1.5 - 6(x-50.0)^2)\,dx$$

let $y = X - 50$

$$E(X) = \int_{-0.5}^{0.5} (y+50)(1.5-6y^2)\,dy$$

$$\int_{-0.5}^{0.5} (-6y^3 - 300y^2 + 1.5y + 75)\,dy$$

$$= \left[-3y^4/2 - 100y^3 + 0.75y^2 + 75y\right]_{-0.5}^{0.5}$$

$= 50$

$e^{-\infty} = 0$

$e^{\infty} =$

$$E(X) = \int_{-\infty}^{\infty} x f(x)\,dx$$

$$= \int_{-\infty}^{\mu} x f(x)\,dx + \int_{\mu}^{\infty} x f(x)\,dx$$

$$\int_{-\infty}^{\infty} x^2\, 2e^{-2x}$$

$$= x^2 \int_{-\infty}^{\infty} 2e^{-2x} - \int_{-\infty}^{\infty} 2x \int_{-\infty}^{\infty} 2e^{-2x}\,dx$$

$$= x^2 \left[\frac{2e^{-2x}}{-2}\right] - \int 2x \left[\frac{2e^{-2x}}{-2}\right]$$

$$= -x^2\left[e^{-2x}\right] - \int x\, 2e^{-2x}\,dx$$

$$= \left[-x^2\left[e^{-2x}\right]\right]_0^{\infty} + \frac{1}{2}$$

$$= \frac{1}{2}$$

A Pair of fair dice find Variance & Std deviation of Sum.

$$f(x) = \begin{cases} x=2 & 1/36 \\ x=3 & 2/36 \\ x=4 & 3/36 \\ x=5 & 4/36 \\ x=6 & 5/36 \\ x=7 & 6/36 \\ x=8 & 5/36 \\ x=9 & 4/36 \\ x=10 & 3/36 \\ x=11 & 2/36 \\ x=12 & 1/36 \end{cases}$$

$$2\times\frac{1}{36} + 3\times\frac{2}{36} + 4\times\frac{3}{36} + 5\times\frac{4}{36} + \cdots$$

$2+6+12+20+30+42+40+30+ \ldots$
$+12+36/36 =$

$\frac{252}{36} = \frac{126}{18} = \frac{63}{9} = \frac{21}{3} = 7$

If $X$ = CRV

Pdf.

$f(x) = \begin{cases} \alpha(2x - x^2) & 0<x<2 \\ 0 & \text{otherwise.} \end{cases}$

find 1) $\alpha$

2) $P(\alpha > 1)$

$\int_{-\infty}^{\infty} f(x)dx = \int_{-\infty}^{0} f(x) + \int_{0}^{2} f(x) + \int_{2}^{\infty} f(x)$

$= \int_0^2 \alpha(2x - x^2) = 1$

$= \int_0^2 2\alpha x - \alpha x^2$

$= \left[\frac{2\alpha x^2}{2} - \frac{\alpha x^3}{3}\right]_0^2 = 1.$

$= 4\alpha - \frac{8\alpha}{3} = 1$

$= 12\alpha - 8\alpha = 3$

$= 4\alpha = 3$

$\boxed{\alpha = \frac{3}{4}}$

$P(\alpha > 1) = \int_1^{\infty} f(x)\,dx.$

$= \int_1^2 f(x)\,dx + \int_2^{\infty} f(x)\,dx.$

$= \left[\frac{3}{4}x^2 - \frac{x^3}{4}\right]_1^2$

$= 3 - 2 - \left[\frac{3}{4} - \frac{1}{4}\right]$

$= 1 - \left[\frac{1}{2}\right]$

$= \frac{1}{2}$

Q If $X$ = CRV.

Pdf

$f(x) = \begin{cases} kx^2 & -3<x<3 \\ 0 & \text{otherwise.} \end{cases}$

find $k$

$P(1 \le x \le 2)$

$P(x > 1)$

$P(x \le 2)$

$\int_{-3}^{3} kx^2 dx = 1$

$\left[\frac{kx^3}{3}\right]_{-3}^{3} = 1.$

$9k - [-9k] = 1.$

$18k = 1$

$\boxed{k = 1/18}$

$P(1 \le x \le 2)$

$= \int_1^2 \frac{1}{18}x^2 = \left[\frac{x^3}{3 \times 18}\right]_1^2.$

## Joint Distribution

Special ...

If X and Y are two discrete random variable we define the joint probability distribution of X & Y by.

$p(X = x, Y = y) = f(x, y)$

where $f(x, y) \geq 0$

2. $\sum_x \sum_y f(x, y) = 1.$

$X = x_j$ is obtained by adding all entries in the rows corresponding to $X_j$ is given by.

$P(X = x_j) = f(x_j) = \sum_{k=1}^{n} f(x_j, y_k)$.

| y | $y_1$ | $y_2$ | ... | $y_n$ | |
|---|---|---|---|---|---|
| $x_1$ | $f(x_1, y_1)$ | $f(x_1, y_2)$ | | $f(x_1, y_n)$ | $f_1(x)$ |
| $x_2$ | | | | $f(x_2, y_n)$ | $f_1(x_2)$ |
| $x_3$ | | | | | $f_1(x_3)$ |
| $x_4$ | $f(x_4, y_1)$ | | | | |
| $x_n$ | $f(x_n, y_1)$ | $f(x_n, y_2)$ | ... | $f(x_n, y_n)$ | |

$F(x, y) = P(X \leq x, Y \leq y)$

$= \sum_{u \leq x} \sum_{v \leq y} f(u, v)$

1) $f(x, y) \geq 0$

$\int_{-\infty}^{\infty} \int_{-\infty}^{\infty} f(x, y)\, dx\, dy$

Graphically $f(x, y)$ represents a Surface called probability surface and valume bounded by this surface on $X$-$Y$ is equal to 1.

And the probability that $x$ lies $a < x < b$ & $c < y < d$.

$p(a < X < b, c < Y < b)$

$= \int_a^b \int_c^d f(x, y)\, dx\, dy.$

* Suppose X and Y discrete R.V. and the events $X = x, Y = y$ are independent events for all X & Y the we Say that R.V are independent random variables.

$P(X = x, Y = y) = P(X = x)\, P(Y = y)$

if for all $x$ and $y$, the joint probability function $F(x, y)$ Can be expressed as product of function of X alone and function of Y alone.

X and Y are independent however if $F(x, y)$ cannot be represented then Capital X and Y are dependent.

If $X$ & $Y$ are CRV
we say that they are independent random variable
if then we say that $X < x$, $Y < y$ are independent event $\forall\ x, y$.

$P(X \le x, Y \le y) = P(X \le x)\, P(Y \le y)$ $F_2$.

* Change of Random Variable.
Given the probability distribution of one or more R.V. we are interested in finding distribution of other R.V which depend on them in some specified manner. The procedures for obtaining this distributions are.

1. Discrete R.V.
Let $X$ be the D.R.V. whose probability function is $f(x)$.
Suppose that D.R.V. $U$ is defined in terms of
$U = \phi(X)$,
where each value of $X$ corresponds to one and only one variable (value) of $U$, and conversely so that
$X = \psi(U)$

Then the probability function.

$g(u) = f[\psi(u)]$

Let $X$ and $Y$ be the DRV having joint prob function
Suppose that two D.R.V. $U$ & $V$.

$U = \phi(X, Y)$
$V = \phi_2(X, Y)$
$g(u) = f[\psi(u)]$

where each pair of values of $x, y$ are corresp to the pair of $u, v$ and conversely

$X = \psi_1(U, V)$
$Y = \psi_2(U, V)$.

then the join prob func of $U$ & $V$ is given as

$g(u, v) = f[\psi_1(u, v), \psi_2(u, v)]$

2. Continuous. R.V.
Let $X$. be a CRV. with prob den fun
let $U = \phi(X)$ wher $X = \psi(U)$ then the pdf of $U$ is given by

$g(u)\,|du| = f(x)\,|dx|$
or
$g(u) = f(x)\left|\frac{dx}{du}\right| = f[\psi(u)][\psi'(u)]$

The density fun of sum of two CRV $X$ & $Y$

$U = X + Y$ having the joint density function $f(x,y)$ given by

$$g(u) = \int_{-\infty}^{\infty} f(x, u-x)\,dx$$

When $X$ & $Y$ are independent random variables

$$f(x,y) = f_1(x)\,f_2(y)$$

$$g(u) = \int_{-\infty}^{\infty} f_1(x)\,f_2(u-x)\,dx.$$

which is called as convolution of $f_1$ and $f_2$ written as $f_1 * f_2$.

Rules :

$f_1 * f_2 = f_2 * f_1$

$f_1(f_2 * f_3) = (f_1 * f_2) * f_3$

Commut
Distribu.
Associative

* Conditional Distribution.

If $X$ & $Y$ are D.R.V. and we are having events $A$ and $B$ as

$A : (X = x)$

$B : (Y = y)$

then the eq. $P(B|A)$

$$= \frac{P(A \cap B)}{P(A)}$$

$$P(Y = y \mid X = x) = \frac{f(x,y)}{f_1(x)}$$

where $f(x,y)$ is joint prob func.

$f_1(x)$ = marginal prob func $x$.

$f(y|x)$ is the conditional probability function.

Similarly $f(x|y) = \dfrac{f(x,y)}{f_2(y)}$

* For CRV.

x —— x —— x —— x —— x ——

* Binomial & Poisson Distribution.

pmf of a binomial random variable $X$ depends on two parameters $n$ and $p$, we denote the pmf by $b(x; n, p)$.

$$b(x; n, p) = \begin{bmatrix} n \\ x \end{bmatrix} p^x (1-p)^{n-x}, \; x = 0, 1 \ldots n.$$

$\sigma_x = \sqrt{npq}$.

$np(1-p)$

$E(X) = np$.

If 75% of puchase is mad by credic card and $X$ is the no amon ten randomly selected purchases.

The binomial R.V with parameter P and N with the prob mass function $f(x) = \binom{n}{x} p^x q^{n-x}$ to find the prob mass funct we have to find the prob of X Successes in n independent trials.

On 5 question MCQ test there are 5 possible ans of which 1 is correct. If a student guesses randomly & independently what is the probability that she is correct only on two questions

$f(x) = \binom{5}{2} \left(\frac{1}{5}\right)^2 \left(\frac{4}{5}\right)^3$

$= \frac{5!}{3!2!} \times \frac{1}{25} \frac{4^3}{25 \times 5}$

$= \frac{5 \times 2 \times 4^3}{25^2 \times 5} = 0.1024$

Q Find the prob that in a family of 4 Children there will be atleast 1 boy

2) Atleast 1 boy & 1 Girl

X = At least 1 boy

Y - At least 1 boy & Atleast 1 Girl.

$P(X) = \binom{4}{1} \left(\frac{1}{2}\right)^1 \left(\frac{1}{2}\right)^3$

$= \frac{4 \times 1}{2 \times 2 \times 2 \times 2}$

$= \frac{1}{4}$ Hence $\frac{15}{16}$

$P(Y) = \left[\binom{4}{1} + \binom{4}{2} + \binom{4}{3}\right]\left[\left(\frac{1}{2}\right)^4\right]$

$= \frac{4! \times 4! \times 4!}{1! \times 2! \times 3! \times 3! \times 2! \times 1!} \times \left[\frac{1}{2^4}\right]$

$= \frac{4 \times 4 \times 3!}{2^4}$

$= \boxed{\frac{7}{8}}$

0.875

Out of 2000 families with 4 Children how many would you expect

1) 2 boy

3) 1 or 2 girls

Q Tell if this binomial

Shuffle a deck of car

given that 2% of the fuses, the manufacture by firm are defect find Probabity

1) box containig 200 fuses had atleast 1 defect

2) No defective fuse.

200

$\boxed{4}$ defective.

1000

20 defective

200.

$$\boxed{P(X=x) = \frac{e^{-\lambda}\lambda^{x}}{x!}}$$

Poisson :

$\lambda = np$

$= 200 \times 0.002$

$\lambda = 4$

$$P(X=0) = \frac{e^{-\lambda}\lambda^{0}}{0!}$$

$= e^{-4}$

0.018

0.9

0.9816

In a certain factory there are manufacturing blades there is a small chance of 0.002 the blad to be defect. The blades are supplied in paket of 10 using poisson distribution as well as binomial dist find the approximate no of pakets containin no

1) defective blade.

2) One defect

In a Consignment of 10,000 packets

No of blades in consignment

$= 10,000 \times 10$

$= 1,00,000$

$\lambda = np$

$= 1,00,000 \times 0.002$

If a bank receives on the average 6 bad cheques per day. Find the probability that it will receive 4 bad cheques on any day

A Web server receives on average of 1,000 queries per day How much excess capacity should it build into be 95% sure that it can meet the demand.

The mean weight of 500 male students at a certain clg is 75

Assuming that the weights are normally distributed find the between 60 and 78 kg (How many students) and more than 92 kg. (deviation = 7 kg)

$\rightarrow \mu = 75$

$n = 500$

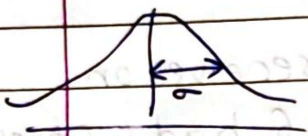
$\sigma = 7$

$$= \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)}{2\sigma^2}}$$

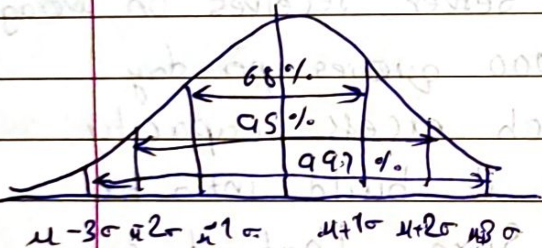
Normal pdfs have two parameter $\mu$ & $\sigma$.

$\mu$ Controls locatn

$\sigma$ contols Spread



68 % of AUC with $\pm 1\sigma$
95 % $\pm 2\sigma$
99.7 $\pm 3\sigma$.




wechsler adul intelligence Scores: Normally

$\mu = 100$, $\sigma = 15$

$X \sim N(100, 15)$

2.21

$\mu \pm \sigma$

$= 100 \pm 15$

$= 80$ to $115$.

68 % of Score,

- As curve is Symmetrical total AUC is exactly 1

$Z = \frac{x-\mu}{\sigma}$

Z Score



Q What percentage of gestation are less than 40 weeks

Q 500 boys prev Ques contin

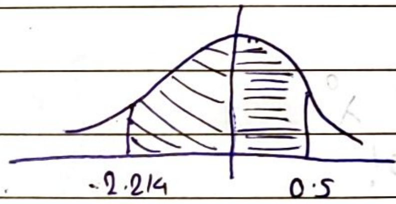
1) betw 60 & 78.

$\boxed{z = \frac{x-\mu}{\sigma}}$

Calculate $z_1$ & $z_2$.

$\frac{59.5-75}{7}$ $\frac{78.5-75}{7}$

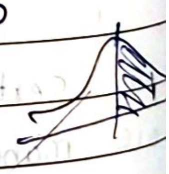
$z_1 = -2.214$ $z_2 = 0.5$

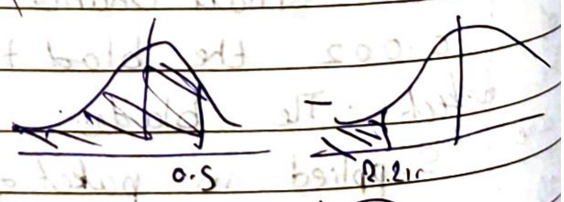


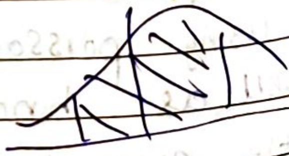

find Area under Curve.

0.0136 0.6915

$\boxed{0.6779}$





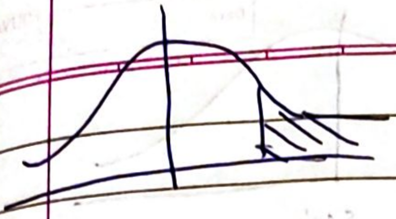



$0.6779 \times 500$

$= 339$ Students

$> 92$

above 92



$z = \frac{92.5-75}{7} = \cancel{2.4285}$

$= 2.36$

$2.50.$

⇒ 1 - below 92.

$= 1 - 0.9909$

$= 0.0091$

al. $\frac{92.5-75}{7} = 2.5$

$1 - 0.9938$

$= \cancel{100}\, 0.0062 \times 500$

$= 3$

Find the prob of getting 3 & 6 heads in 10 tosses of fair coin by using binomial distribution and the normal approximation to the binomial distribution

$\lambda = np$

$= 10$

In a simultaneous inspection of 10 units. The pro of ~~geen~~ defective unit & not defect are equal Find prob of getting atleast 7 non defective unit and atleast 2 non defective units.

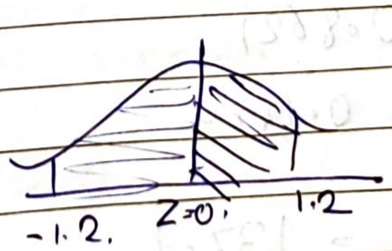
The mean inside diameter of a sample of 200 washers produced by a machine is 0.502 inches.

S.D = 0.005.

0.496 to 0.508 inches.
else consider defective,
determine the %age of defective washers produce assuming the diameters of are normally distributed.

$z_1 = \frac{0.496 - 0.502}{0.005} = -1.2$

$z_2 = \frac{0.508 - 0.502}{0.005} = 1.2$




$0.8849$
$-0.5000$
$0.3849$

$0.3449 \times 2$

$= 0.7678$

$= 77\%$

The marks of
by 1000 students
are normally distributed
with mean 78 %
and S.D. 11 %
Determine How many
Students got marks
above 90 %

2 What are the highest
Score by the
lowest 10% of the
Students.

Find the limits of 90 %
marks.

$\mu = 0.78$

$\sigma = 0.11$

$N = 1000.$

$P(X > 0.90)$ $\quad Z = \dfrac{.90 - .78}{.11}$

$= 1.09.$

$= 0.8621$

$1 - 0.8621$

$= 0.1379$

No of Stu $= 137.9$

$\approx 138$

Q. Highest of lowest 10%.


$\cancel{Z_1 = \dfrac{.10 - .78}{0.11} = -6.18}$

$P(X < X_1) = 10\% = 0.1$

$P(Z < Z_1) = 0.1$

$A(Z_1) + A(Z < Z_1) = 0.5$

$= 0.5 - 0.1$

$= 0.4$

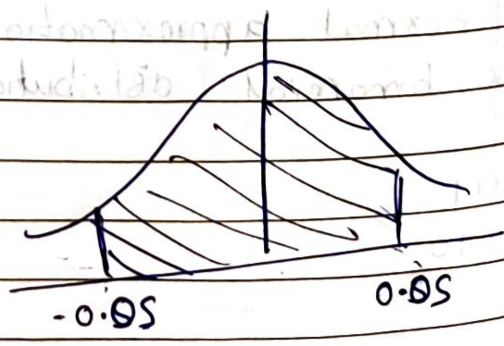
$-1.28 = \dfrac{x - 0.78}{0.11}$

$x = 0.11 \times -1.28 + .78$

$= x = 0.6392 \times 100$

$= 63.92$

$= 64\%$




$\cancel{2 \times 0.5}$

$\dfrac{0.05 - .78}{.11}$

the

In a normal distribution 7% of the items < 35

89% of items are under 63 determine mean and variance of the distribution

Prob

1.64

bayes

ind even

Random Var

Descr

Con

Joint

Change of

Pd rava

Condit dist

Binom

Norm

Poisn

Relationsh betw Binom Norm & Poissn.

0.9382.

Poisson distribution is given as $X \sim P_0(\lambda)$

$$P(X=x) = \frac{\lambda^x e^{-\lambda}}{x!}, \; x=0,1,2\ldots$$

A poisson dist arises when the events being counted a independently such that the probability that two or more event occur simultaneously

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YOUVA

Given length of material accidents on a particular part of road in a given time or telephone calls made to a call centre in one day.

and the key parameter in fitting the is the mean value.

2% of the fuses, ......

200 fuses has atleast 1 defect.

$\lambda = np$

$= 200 \times 0.002$

$= 4$

20% of items from a factory are defective find the prob that in a sample of 5 chosen at random none defective item is chosen.

2. One is defective

3. $P(1 < X < 4)$

$P(X=0)$

P&S by Murray Spiegel Schaum Series.

1, 2, 4