

	CIASSMALE Data : Paga :
*	Mathematics - 3 (M3) - Assignment Number - 94.
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Q-1.	A fair coin is tossed 600 times. Using normal distribution, find the productily of getting: i) Number of heads less than 270. ii) Number of heads between 280 to 360.
->	A fair coin tossing 600 times results into head or tail which is P=0.5
6	Let $\alpha = Number of heads in 600 tosses$ $\alpha \rightarrow \beta (600, 0.5)$
	$II = E(x) = nn = 600 \times 0.5 = 300$ $\sigma^2 = Var(x) = nnq = 600 \times 0.5 \times 0.5 = 150$
	i) P(Number of heads less than 270)
	$P(x < 270) = P(x-11 < 270-30) P(x-nP < 270-800)$ $= \sqrt{160} \sqrt{nyy} \sqrt{160}$
	$= P(z < -2.4495)$ $= P(z > 2.4496)$ $\therefore P(x < 270) = 0.0071428$

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ii) P (Number of heads are between 280 and 380)
           P(2802 22350) = P(280-300 2 2 2350-300)

\frac{\sqrt{160}}{\sqrt{160}} = \frac{\sqrt{150}}{\sqrt{150}}

Thing z = x-4 \longrightarrow N(0,1), we get

P \simeq P(-1.633 \le z \le 4.0823) = B = 1 - A - C.

                                      = 1 - P(z = -1.633) - P(z > 4.0823)
                                       = 1 - P(Z > 1.633) - P(Z > 4.0823)
                                      = 1-0.51551 - 0.000022518
                         : P(280 < X < 350) = 0.4845
Q-2. In a certain examination test, 2000 students in a subject of statistics.
         Avery marks obtained were 50% with standard deviation 5%. How
          many student do you expect to obtain more than 60% of marks supposing that marks are distributed normally.
                                                                    1 L Nov. 2017
          Yiven: - U= 0.5
                                 , 6 = 0.05
                \chi_1 = 0.6 Z_1 = 0.6 - 0.5 = 2
                                                 0.05
                  : lorresponding of Z= 2 is 0.4772
                           :. \rho(\chi \ge 6) = \rho(\chi \ge 2) = 0.5 - 0.4772
                                                     = 0.0228.
         :. Number of student expected to get more than 60% marks = 0.0228x2000
                                                                      = 48 students oppress
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Q-3. Assuming that the diameters of 1000 brass plugs takes consecutively from machine form a normal distribution I with mean 0.7515 Jan and standard deviation 0.0020 cm. How many of the plugs are likely to be approved if the accelable diameter is 0.752 ± 00.0042

 $\sigma = 0.0020 cm$ 11 = 0.7515 $\chi_1 = 0.752 + 0.004 = 0.756$

 $\chi_2 = 0.752 - 0.004 = 0.748$

Z = x-11, we have.

 $Z_1 = \frac{\chi_1 - 11}{6} = \frac{0.766 - 0.7515}{0.0020} = 2.25$

 $Z_2 = 2 \frac{1}{2} - \frac{1}{2} = 0.748 - 0.7515 = -1.75$ 0.0020

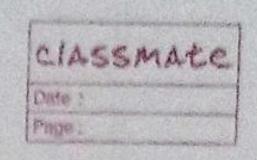
A₁ corresponding $to(z_1 = 2.25) = 0.4878$

A₂ corresponding to $(z_2 = -1.75) = 0.4099$

P(0.740 L x L 0.756) = A1 + A2 = 0.4878 +0.40 99 = 0.9477.

:. Number of plugs likely to be approved = 1000 x 0.9477 = 948 approx.

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Q-4.	In a certain factory turning out rayor blades, there is a small chance of 1/500 for large Jacque of Slade to be defective. The blades are
	calculate the approximate number of passion oustribution to calculate the approximate number of packets contains no defective and two defective blades, in a consignment of 10000 packets. [May 2018]
	$P(ns - delection) = P(r=0) = \frac{e^{-0.02}(0.02)^{\circ}}{0!} = \frac{1}{e^{0.02}}$
	$P(2 - defective) = P(z=2) = e^{-0.02} (0.02)^{2} = 0.0001960$
	:. Number of packets containing no defective blades in consignment of 10000 packets
	= 10000 × 0.9801 = 9802 packets :. Number of packets containing two defective blades in consignment of 10000 packets
	10000 putitits



A manufacturer of cotter pins knows that 27 of his product is adjective. If he sells cotter pins in boxes of 100 pins and garantees that not more than 5 pins will be dejective in a box. Find the approximate probability that a box will sail to meet the gauranteed quality.

Here, n=100

 $P \rightarrow the$ probability of defective pins = $\frac{2}{100} = 0.02$.

z = mean number of defective pins in a box

 $z = \eta = 100 \times 0.02 = 2$

Since p is small, we can use poission distribution.

$$P(z) = e^{-z} z^{2}$$

$$z!$$

$$= e^{-2} (2)^{2}$$

$$z!$$

$$P(\chi > 5) = 1 - P(\chi \le 5)$$

$$= 1 - \frac{2}{2} e^{-2}(2)^{\frac{1}{2}} = 1 - e^{-2} \frac{5}{2} (e)^{\frac{1}{2}}$$

$$= \frac{1 - e^{-2} \frac{5}{2} (e)^{\frac{1}{2}}}{\chi!}$$

$$= 0.0165$$

:. Probability that a box will fail = 0.0165.