Sardar Vallabhbhai Patel Institute of Technology, Vasad

Subject: Probability and Statistics Subject Code:310006

Tutorial 7: NORMAL DISTRIBUTION

Q1	Distribution of height of 1000 students is normal with mean 165 cms and standard deviation 15 cms. How many soldiers are of height : (i) less than 138 cms (ii) more than 198 cms (iii) between 138 and 198 cms. [P(z=1.8)=0.4641, P(z=2.2)=0.4861]
Q2	The average daily sales of 500 branch offices was Rs. 150 thousand and the standard deviation Rs. 15 thousand. Assuming the distribution to be normal indicate how many branches have sales between : a) Rs. 120 thousand and Rs. 145 thousand b) Rs. 140 thousand and Rs. 165 thousand. [P(0<Z<2)= 0.4772, P(0<z<0.33) = 0.1293, P(0<Z<1) = 0.2486]
Q3	Suppose the marks of 800 students are normally distributed with mean 66 and standard deviation 5. Find number of students getting marks (i) between 65 and 70 (ii) greater than or equal to 72 [Given that $P(0 \leq z \leq 0.20) = 0.0793$, that $P(0 \leq z \leq 0.80) = 0.2881$ and that $P(0 \leq z \leq 1.2) = 0.3849$]
Q4	The actual amount of instant coffee that a filling machine puts into “4 -ounce” jars may be looked upon as a random variable having a normal distribution with $\sigma = 0.04$ ounce. If only 2 % of the jars are to contain less than 4 ounces, what should be the mean fill of these jars? Out of 10000 jars sold, how many are expected to contain more than 4.2 ounces?
Q5	The probability that an electronic component will fail in less than 1000 hours of continuous use is 0.25. Use the normal approximation to find the probability that among 200 such components fewer than 45 will fail in less than 1000 hours of continuous use.
Q6	Define Standard normal variate and State the properties of the Normal Distribution.

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Q7	The lifetime of a certain kind of batteries has a mean life of 400 hours and the standard deviation as 45 hours. Assuming the distribution of lifetime to be normal. Find The percentage of batteries with lifetime (i) at least 490 hours, (ii) between 385 and 490 hours. Also, find the minimum life of the best 5% of batteries. [Use: $P(0 < z < 2) = 0.4772$, $P(0 < z < 0.33) = 0.1293$ and $P(0 < z < 1.65) = 0.45$]
Q8	In an examination, minimum 40 marks for passing and 75 marks for distinction are required. In this examination 45% students passed and 9% obtained distinction. Find average marks and standard deviation of this distribution of marks. [$P(z = 0.125) = 0.05$ and $P(z = 1.34) = 0.41$]
Q9	Assume that 5 % of the apples weigh less than 150 gm and 20 % of the apples weigh more than 225 gm. If the distribution of the weight of the apples is normal, find the mean and standard deviation of the distribution.
Q10	The life of batteries manufactured by a battery manufacturer can be modelled as a random variable having approximately a normal distribution with $\mu = 50$ months and $\sigma = 6$ months. Find the probability that the mean of a random sample of 36 such batteries will be less than 48 months.