

Department of Mathematics

Probability and Random Processes

15B11MA301

Tutorial Sheet 8

C201.3

Normal Distribution

1. In a normal population with mean 12 and standard deviation 4, it is known that 750 observations exceed 15. Find the total number of observations in the population. (Ans. ≈ 3310)
2. At a certain examination 10% of the students who appeared for the paper in Advanced Mathematics got less than 30 marks and 97% of the students got less than 62 marks. Assuming the distribution is normal, find the mean and the SD of the distribution.
(Ans. $\mu = 42.97, \sigma = 10.13$)
3. It is given that X and Y are independent normal variates and $X \sim N(1, 4)$, $Y \sim N(3, 16)$. Find the value of K such that $P(2X + Y \leq K) = P(4X - Y \geq 2K)$.
(Ans. $K = (5\sqrt{5} + \sqrt{2}) / (\sqrt{5} + 2\sqrt{2})$)
4. Variable X is a normal random variable with standard deviation 3. If the probability that X is less than 16 is 0.84, then the expected value of X is approximately? (Ans: 13)
5. If $P\{-3 < Z < -2\} = P\{2 < Z < x\}$, then find x (Ans: 3.02)
6. If $P\{-a < Z < a\} = 2P\{Z < a\} - 1$, then find a . (Ans: $a \in (-\infty, \infty)$)
7. Find x (using three type of standard normal table) if
 - (i) $P\{Z > x\} = 0.05$ (ii) $P\{Z > x\} = 0.95$ (iii) $P\{Z < x\} = 0.66$ (iv) $P\{Z < x\} = 0.40$
 - (v) $P\{|Z| < x\} = 0.99$ (vi) $P\{|Z| < x\} = 0.1$ (vii) $P\{|Z| > x\} = 0.9$ (viii) $P\{|Z| > x\} = 0.8$
(Ans: (i) 1.65, (ii) -1.65 (iii) 0.42 (iv) -0.25 (v) 2.17 (vi) 0.13 (vii) -1.64 (viii) 0.26)