

Normal Distribution

1. Given a normal distribution with mean (μ) = 100 and s.d. (σ) = 10. What is the probability that.
 - a) $X > 75$
 - b) $X < 70$
 - c) $X > 112$
 - d) $75 < X < 85$
 - e) $X < 80$ or $X > 110$?
 - f) 70% of the values are less than what X values?
 - g) 70% of the values are between what two X values (symmetrically distributed around the mean)?
2. A particular product has a declared weight of 60 gm. Assume the process mean is 61.8 gm and the standard deviation is known for the 1.5 gm. Assume the weight is normally distributed.
 - a) What proportion of product will be above the declared weight?
 - b) Determine the proportion of product below 95% of the declared weight.
 - c) Determine the proportion of product between 60 gm and 63 gm.
3. The income of a group of 20000 persons was found to be normally distributed with mean Rs. 7500 and standard deviation Rs. 500. Find:
 - a) The lowest income of richest 20% of persons
 - b) The highest income of poorest 10% of persons
4. In a normal distribution with a standard deviation of 5, the probability that an observation selected at random exceeds 21 is 0.4. Find the mean of the distribution.
5. Sack of grain packed by an automatic machine loader follow normal distribution having an average weight of 114 kg. It is found that 15% of bags are over 115 kg. Find the standard deviation.
6. Find the mean and standard deviation of a normal distribution of marks in an examination where 44% of the students obtained marks below 55 and 6% obtained above 80 marks.
7. A continuous random variable, X follows a normal distribution such that 80% of the values are between two X values, 87.2 and 112.8 (symmetrically distributed around the mean). Find mean (μ) and standard deviation (σ) of the distribution.
8. Given that a random variable X has a binomial distribution with $n=50$ trials and $p=0.25$, use the normal approximation to binomial distribution to find:
 - a) $P(X=7)$
 - b) $P(9 < X < 14)$
 - c) $P(X < 18)$
 - d) $P(X > 10)$
9. The average number of accidents on each year in a busy road is 35. Find the probability that there are more than 45 accidents in a year by using normal approximation to Poisson distribution.