

## Application of Normal Probability Distribution

1) -On a given test the average test scores was 68 with standard deviation of 8. If the scores are normally distributed, then find the probability as what percentage of students got scores

a) Between 60 and 70? **Answ:44.05%**

b) Between 70 and 80? **Answ:33.45%**

c) Between 80 and 90? **Answ:6.38%**

d) Less than 60? **Answ: 15.86%**

e) More than 90? **Answ:0.29%**

f) Find the cut-off point for F if the bottom 5% will be getting "F". **Answ: 54.84**

g) Find the cut-off point for "A" if the top 5% will be getting "A" **Answ:81.16**

h) Find the score for Q1 **Answ:62.60**

i) Find the  $P_{30}$  **Answ:63.80**

j) Find the  $P_{70}$  **Answ: 72.18**

k) Find the  $P_{50}$  **Answ: 68**

2) The cholesterol level for adult males of a specific racial group is approximately normally distributed with a mean of 4.8 mmol/L and a standard deviation of 0.6 mmol/L.

a) What is the probability that a person has moderate risk if his cholesterol level is more than 1 but less than 2 standard deviations above the mean: **Answ: 13.6%**

b) A person has high risk if his cholesterol level is more than 2 standard deviations above the mean, i.e., greater than 6.0 mmol/L. What proportion of the population has high risk **Answ: 2.28%**

c) A person within 1 standard deviation of the mean has normal cholesterol risk  
What proportion of the population has high risk **Answ: 68.26%**

d) A person has low risk if his cholesterol level is 1 standard deviation or more below the mean.  
What proportion of the population has high risk **Answ: 15.87%**

e) What is the 90<sup>th</sup> percentile of the distribution, i.e., the cholesterol level that exceeds 90% of the population? **Answ: 5.569**

f) What is the 70<sup>th</sup> percentile of the distribution, i.e., the cholesterol level that exceeds 70% of the population? **Answ: 5.11:**

3). Given the average height of adult male in United States is 65 inches with standard deviation of 8 inches and if the minimum and maximum acceptable heights for being recruited by ARMY is between 55 and 85 inches, then find the percentage of adult male that may be rejected because of their heights? **Answ: 11.19**

4) The average life of a certain type of motor is 10 years, with a standard deviation of 2 years. Assume that the lives of the motors follow a normal distribution

- a) What percentage of motors last longer than 15 years? **Answ: .0062 = .62%**
- b) What percentage of motors last less than 7 years? **Answ: 0.668 = 6.68 %**
- c) If the manufacturer is willing to replace only 3% of the motors that fail, how long a guarantee should he offer? **Answ: 6.24 years**
- d) If the manufacturer is willing to replace only 5% of the motors that fail, how long a guarantee should he offer? **Answ: ? 6.71 years**

5) A company pays its employees an average wage of \$8.25 an hour with a standard deviation of 0.80 cents. If the wages are approximately normally distributed, determine

- a. the proportion of the workers getting wages between \$6.75 and \$10.75 an hour; **Answ: 96%**
- b. the minimum wage of the highest 5%. **Answ: \$9.57**
- c. the minimum wage of the lowest 10%: **Answ: \$7.23**
- d. What is the 90<sup>th</sup> percentile of the distribution **Answ: \$9.27**
- e. What is the 30<sup>th</sup> percentile of the distribution **Answ: \$7.83**
- f. What is the 75<sup>th</sup> percentile of the distribution **Answ: \$8.79**