STAT 340

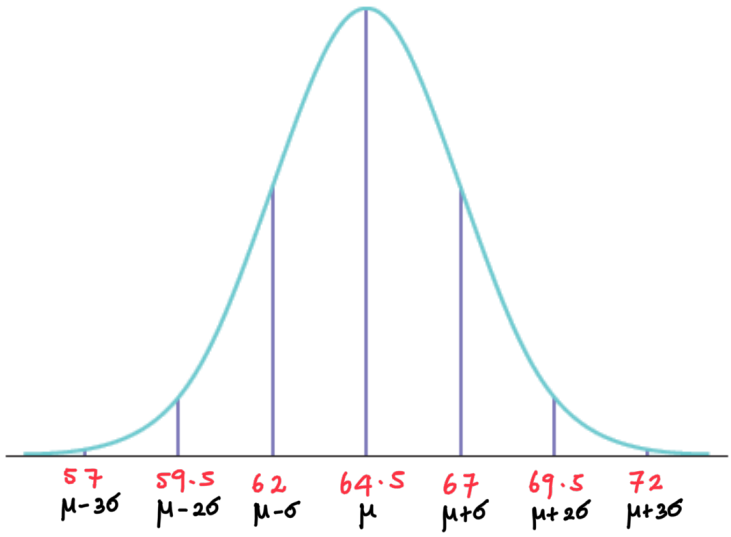
Chapter 11 – Practice Questions

Part I

1. Heights of women aged 18 – 24 years old is normally distributed with a mean of 64.5 inches and with a standard deviation of 2.5 inches.

$X =$ Heights of women aged 18-24 years old

$\mu = 64.5$ and $\sigma = 2.5$



a. $P(X < 64.5) =$ 0.5

b. $P(57 < X < 72) =$ 0.997

c. $P(X > 59.5) =$ $P(59.5 < X < 64.5) + P(X > 64.5)$

$= \frac{0.95}{2} + 0.5 = 0.97$

d. $P(62 < X < 72) =$ $P(62 < X < 64.5) + P(64.5 < X < 72)$

$= \frac{0.68}{2} + \frac{0.997}{2} = 0.8385$

e. $P(X < 57 \text{ or } X > 72) =$ $P(X < 57) + P(X > 72)$

$= 1 - 0.997$

$= 0.003$

$X \sim N(100, 16)$

2. The IQ of students is normally distributed with a mean of 100 and with a standard deviation of 16. Calculate z-scores for

   a. IQ = 124 $\quad z = \frac{124 - 100}{16} = 1.5$

   b. IQ = 96 $\quad z = \frac{96 - 100}{16} = -0.25$

3. Find the following probabilities using the standard normal table.

   a. $Z \sim N(0, 1)$

   $P(Z > 1) = 1 - P(Z < 1) = 1 - 0.8413 = 0.1587$

   b. $Y \sim N(10, 20)$

   $P(Y < 30) = P\left(Z < \frac{30-10}{20}\right) = P(Z < 1) = 0.8413$

4. The weight of potato chips bags filled by an automated machine follows the Normal Distribution with a mean of 24 oz and with a standard Deviation of 0.6 oz. If you purchase a chips bag filled by this machine, what is the probability the weight is between 23.7 oz and 24.3 oz?

$X \sim N(24, 0.6)$

$P(23.7 < X < 24.3)$

$= P(X < 24.3) - P(X < 23.7)$

$= P\left(Z < \frac{24.3 - 24}{0.6}\right) - P\left(Z < \frac{23.7 - 24}{0.6}\right)$

$= P(Z < 0.5) - P(Z < -0.5)$

$= 0.6915 - 0.3085$

$= 0.383$