*R - ASSIGNMENT CODES*

1. Let t be the time it takes to work on a transmission. Since the work begins 10 minutes after drop-off, we need the work to be completed in *t* ≤ 50 minutes.

Z = (50 – 45)/8 = 0.625

P(Z ≤ 0.62) = 0.7324 (from the Z-table)

Therefore P(T > 50) = 1 – P(T ≤ 50) = 1 – 0.7324 = 0.2676

**Ans is B**

Or we can use R-function [1-pnorm(50,45,8)]

1. **A . Ans is False**. The probability of the region between 38 and 44 corresponds to *P*(0 < *Z* < 1) = 1/3 whereas the region above 44 corresponds to *P*(*Z* > 1) = 1/6.

**B. Ans is True**. P(Z ≤ (30 – 38)/6) = P(Z ≤ - 1.33) = 0.0912**.** This multiplied by 400 gives expected count.

**3.** Both will have normal distributions, but the second one has lower variance. 2*X1* is simply a scaled version of the random variable *X1*. So the distribution of 2*X1* will have a shape identical to that of *X1* i.e. it will have a normal distribution. The sum of two independent normally distributed random variables also has a normal distribution. Therefore *X*1 + *X*2 has a normal distribution.

1. **Ans is D.** The required range here is 100 +- 2.58\*20 = [48.4 ,151.6].
2. E[X] = E[45\*(Profit1 + Profit2)] = 45\*(5 + 7) = 540 mn, SD = 225 mn.
3. The required range is 540 +- 1.96\*225 = [99,981] mn.
4. We need the 5th percentile of X i.e. the point on the distribution of X, such that there is only 5% of the area to the left. Z is -1.645 and therefore required value of X is 540 – 1.645\*225 = 169.875 mn.
5. For Division 1: Z-score for a profit of zero = (0 – 5)/3 = (- 1.67)

For Division 2: Z-score for a profit of zero = (0 – 7)/4 = (- 1.75)

The probability of loss for division 1 is the area under the standard normal distribution is to the left of (-1.67), and that for division 2 is the area under the standard normal distribution is to the left of (-1.75). Therefore the probability associated with the second one will be lower.