4. LESSON: PROPOSED EXERCISES

To solve the following proposed exercises, the theory corresponding to lesson 4, the standard normal table provided as well as the examples shown in the solved exercises of the same lesson will be very helpful.

1. The lifespan of an electronic device, measured in weeks, is a random variable that follows an exponential distribution in which $\lambda=0.002$. Calculate the probability that the lifespan of the electronic device is:
   a) More than 100 weeks.
   b) A maximum of 30 weeks.
   c) Between 30 and 100 weeks.

Solution: a) 0.8187; b) 0.0582; c) 0.1230.

2. The length in mm of the pieces produced by a factory is a random variable that follows a normal distribution. The mean value is 30 and the standard deviation is 6. By selecting a piece randomly, calculate the probability that:
   a) Its length is greater than 17 mm.
   b) Its length is less than 22 mm.
   c) Its length is between 32 and 41 mm.
   d) For what central values the probability between them is 75%.

Solution: a) 0.9850; b) 0.0918; c) 0.3371; d) 23.1 and 36.9.

3. A company dedicated to the repair of concrete machinery has the following data: using its system they manage to repair the machine in 80% of cases. To confirm the operation of this system, the quality department will receive 100 machines and if 75 or more can be repaired, the system will be valid.
   a) What is the probability that the system will not be valid?
   b) If machine reparation is 70%, what is the probability that the system will be considered valid?

Solution: a) 0.0838; b) 0.1635.

4. The lengths of the pieces manufactured in A company follow a normal distribution in cm, with a mean value of 72 and a standard deviation of 8. On the other hand, the lengths of the pieces made in B company follow a normal

distribution in cm, where the mean is 60. Taking into account that the length of 10% of the pieces made in B company is greater than 72, calculate:

a) The standard deviation of pieces in B company.
b) Probability that the length of a piece from A company is greater than 75.
c) Probability that the length of a piece from A company is less than 60.
d) What is more probable, that the length of a piece from A company is less than 64 or that the length of a piece from B company is greater than 55?

Solution: a) 9.3636; b) 0.3538; c) 0.0668; d) Is more probable that a piece from B company is greater than 55.