Applications of Normal Distribution

1. The average height of a man in Ireland is 177 cm, with a standard deviation of 8 cm. Assume that heights are normally distributed. An Irish man is selected at random. What is the probability that his height is:

    i. Over 185 cm?

    ii. Less than 180 cm?

    iii. Between 180 and 185 cm?

2. Leaving Certificate points are normally distributed with a mean 375 and standard deviation 90. If 595 points are required to be eligible to study medicine in college, what percentage of Leaving Cert students will be eligible for medicine, based on their points? *VIDEO*

3. The average life of a timing belt in the engine of a certain car is 80,000 miles, with a standard deviation of 12,000 miles. If a timing belt is selected and tested, find the probability that it will have the following lifetime. Assume the variable is normally distributed.

    i. Between 68,000 and 80,000 miles.

    ii. Between 80,000 and 88,000 miles.

    iii. Between 68,000 and 88,000 miles.

4. The journey time for a bus trip from Limerick to Dublin is normally distributed with an average of 185 minutes, and a standard deviation of 10 minutes. If one of these trips is selected at random, find the probability that the bus journey will take:

    i. At least 170 minutes.

    ii. At least 3 hours and 15 minutes.

5. The average annual rainfall in Ireland is normally distributed with a mean of 1,150 mm and a standard deviation of 250 mm. What is the probability that next year there will be: *VIDEO*

    i. Less than 1,000 mm of rainfall in Ireland?

    ii. More than 1,400 mm of rainfall in Ireland?

    iii. Between 1,000 and 1,400 mm of rainfall in Ireland?

6. A round of golf burns an average of 1,500 calories. If the standard deviation of the distribution is 120 calories, find the probability that a person who plays one round of golf will burn the following calories. Assume the variable is normally distributed.

    i. More than 1,350 calories?

   ii. Less than 1,600 calories?

  iii. Between 1,400 and 1,650 calories?

7. In July, the average temperature of Lough Derg is $15.3°$ and the standard deviation is $1.4°$. Assume the variable is normally distributed. For a randomly selected day in July, find the probability that the temperature will be as follows:

    i. Above $15°$

   ii. Below $18.5°$

  iii. Between $16°$ and $18°$

8. If Leaving Cert points are normally distributed with a mean of 375 points and a standard deviation of 90 points, how many points does a student need to be in the top 10%? *VIDEO*

9. Any student who scores in the bottom 15% of a particular reading test is eligible for assistance in their final exams. If scores on the reading test are normally distributed with an average of 68, with a standard deviation of 10, below what score will a student be eligible for assistance?

10. The average weight of an Irish man is 77 kg, with a standard deviation of 14 kg. For a health study, a volunteer must have a weight that is in the middle 50%.If the variable is normally distributed, between what weights should a man be in order to enable him to volunteer to participate in the study? *VIDEO*

11. The average price house in Co. Limerick is €145,269, with a standard deviation of €12520. Find the maximum and minimum prices of the houses a developer will build to include the middle 60% of the market. Assume that the variable is normally distributed.

12. A 10 km road race has an average finishing time of 65.25 minutes with a standard deviation of 5.6 minutes. Any athlete who finishes in the top 20% of times will win a free pair of trainers from the race sponsor. Assuming the times are normally distributed, what finishing time is required for an athlete to win a free pair of trainers?