0.1 Question D05 - Normal Distribution Question 1

Assume that the number of weekly study hours for students at a certain university is approximately normally distributed with a mean of 22 and a standard deviation of 6.

i. Find the probability that a randomly chosen student studies less than 12 hours.

ii. Estimate the percentage of students that study more than 37 hours.

0.2 Question D06 - Normal Distribution

record from a direct access storage system device of 200 milliseconds with a standard deviation of 58 milliseconds. If it can be assumed that the data are normally distributed:

(i) What proportion of retrieval times will be greater than 75 milliseconds?

(ii) What proportion of retrieval times will be between 150 milliseconds and 250 milliseconds?

(iii) What is the retrieval time below which 10% of retrieval times will be?

0.3 Question D07 - Normal Distribution

A scientific publishing house produces assembly manuals for kit cars. The number of manuals sold every year is known to be normally distributed with a mean of 500 and a standard deviation of 50.

a. (2 marks) What is the probability that the number of manuals sold will exceed 600?

b. (2 marks) What is the probability that the number of manuals sold will be less than 300?

c. (2 marks) What is the probability that the number of manuals sold will be between 450 and 550?

d. (2 marks) What is the minimum number of manuals that the company must print such that that 90% of the demand is satisfied?

0.4 Question D08 - Normal Distribution Question 2

Taken from MA4104 Business Statistics Examination paper, Spring 2008 Question 1 part A

A tyre manufacturer claims that under normal driving conditions, the tread life of a certain tyre follows a normal distribution with mean 50,000 miles and standard deviation 5000 miles.

(i) If your tyres wear out at 45,000 miles, would you consider this unusual? Support your answer with an appropriate probability calculation using the normal curve.

(ii) If the manufacturer sells 100,000 of these tyres and warrants them to last at least 40,000 miles, about how many tyres will wear out before the warranty expires?

0.5 Question D09 - Normal Distribution (3 Marks)

Suppose X is a normally distributed random variable with mean $\mu = 500$ and $\sigma = 24$

a. (1 Mark) Compute the value of $P(X \geq 518)$

b. (1 Mark) Compute the value of $P(X \leq 482)$

c. (1 Mark) Compute the value of $P(482 \leq X \leq 518)$

0.6 Normal Distribution - Short Questions

1. 95% of students at school weigh between 62 kg and 90 kg. Assuming this data is normally distributed, what are the mean and standard deviation?

2. A machine produces electrical components. 99.7% of the components have lengths between 1.176 cm and 1.224 cm. Assuming this data is normally distributed, what are the mean and standard deviation?

3. 68% of the marks in a test are between 52 and 64 Assuming this data is normally distributed, what are the mean and standard deviation?

0.7 Question D10 - Exponential Distribution

Assume that the length of injected moulded plastic components are normally distributed with a mean of 10mm and a standard deviation of 2mm. Draw a rough sketch and then calculate corresponding probability for the following measurements occurring on an individual component:

(i) Between 10 and 12.4mms

(ii) Less than 9.7 mms

(iii) Between 9.8 and 10.1 mms

(iv) Less than 10.3 mms

1. The Fresha Tea Company pack tea in bags marked as 250 g A large number of packs of tea were weighed and the mean and standard deviation were calculated as 255 g and 2.5 g respectively. Assuming this data is normally distributed, what percentage of packs are underweight?

2. Students pass a test if they score 50% or more.

   The marks of a large number of students were sampled and the mean and standard deviation were calculated as 42% and 8% respectively.

   Assuming this data is normally distributed, what percentage of students pass the test?