Daily Question – Applied Mathematics - Day 1 Dec 2025

Topic: Normal Distribution and Probability

The journey time for Charlie to travel to the train station is normally distributed with mean 25 minutes and standard deviation 6 minutes. If Charlie's journey time is less than 20 minutes, he will have time to buy a coffee before boarding his train.

(a) Find the probability that, on a randomly selected day, Charlie has time to buy a coffee.

(3)

In a particular week, Charlie travels to the station on 2 days.

(b) Find the probability that he has time to buy a coffee on just one of these days.

(3)

On 1% of days, Charlie's journey time is longer than m minutes.

(c) Find the value of m.

(3)

A new road is built and this should make Charlie's journey time to the station more reliable.

(d) State, giving a reason, what effect you would expect this to have on the standard deviation of Charlie's journey times to the station.

(1)

After the new road was built, Charlie's journey time to the station is still modelled by a normal distribution with mean 25 minutes but the standard deviation, δ, has changed. In the first 20 journeys to the station using this new road, Charlie took longer than 30 minutes on 3 occasions.

(e) Estimate the value of δ.

(4)

(Total for question = 14 marks)