

Normal Distribution – 2020 AS

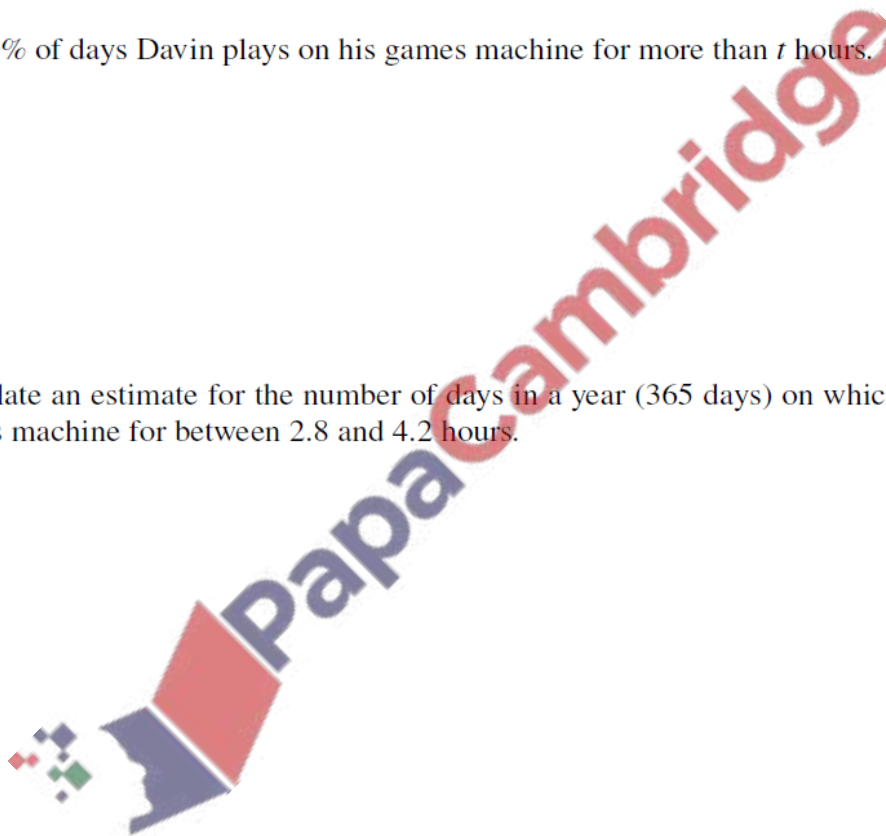
1. Nov/2020/Paper_9709/51/No.5

The time in hours that Davin plays on his games machine each day is normally distributed with mean 3.5 and standard deviation 0.9.

(a) Find the probability that on a randomly chosen day Davin plays on his games machine for more than 4.2 hours. [3]

(b) On 90% of days Davin plays on his games machine for more than t hours. Find the value of t . [3]

(c) Calculate an estimate for the number of days in a year (365 days) on which Davin plays on his games machine for between 2.8 and 4.2 hours. [3]



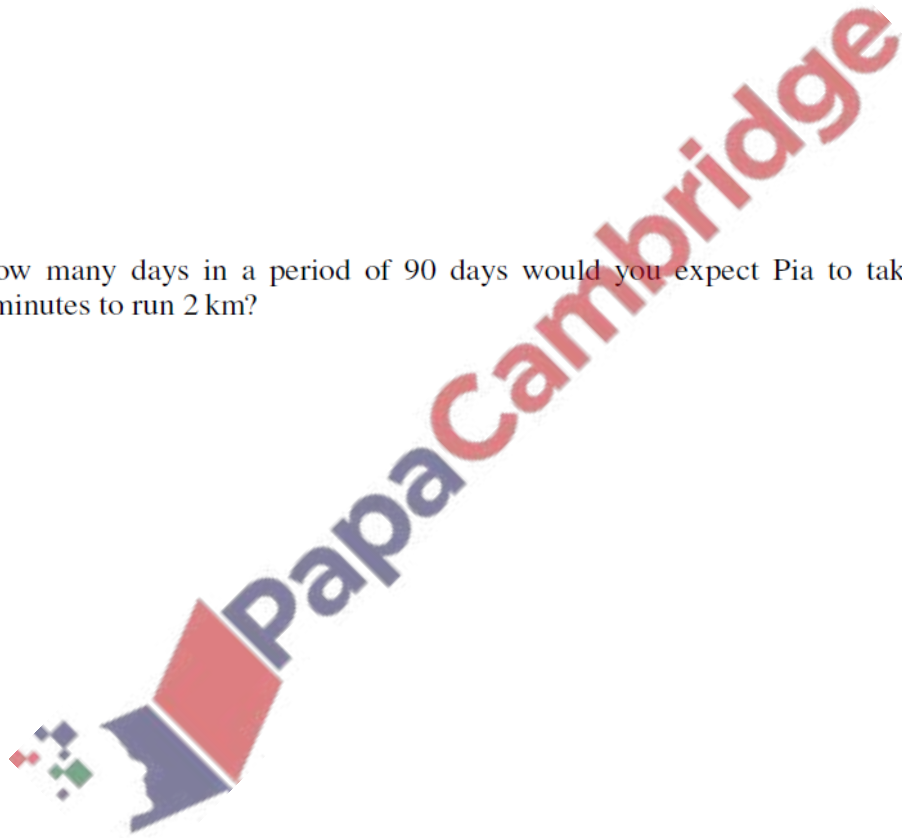
2. Nov/2020/Paper_9709/52/No.3

Pia runs 2 km every day and her times in minutes are normally distributed with mean 10.1 and standard deviation 1.3.

(a) Find the probability that on a randomly chosen day Pia takes longer than 11.3 minutes to run 2 km. [3]

(b) On 75% of days, Pia takes longer than t minutes to run 2 km. Find the value of t . [3]

(c) On how many days in a period of 90 days would you expect Pia to take between 8.9 and 11.3 minutes to run 2 km? [3]

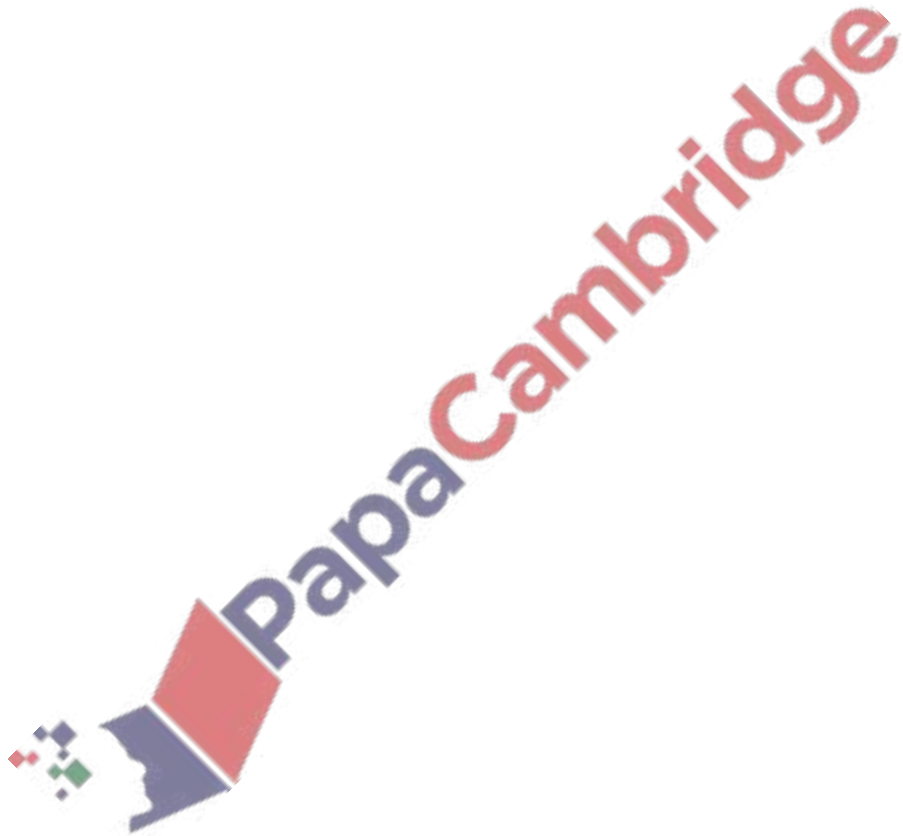


3. Nov/2020/Paper_9709/53/No.1

The times taken to swim 100 metres by members of a large swimming club have a normal distribution with mean 62 seconds and standard deviation 5 seconds.

- (a) Find the probability that a randomly chosen member of the club takes between 56 and 66 seconds to swim 100 metres. [3]

- (b) 13% of the members of the club take more than t minutes to swim 100 metres. Find the value of t . [3]



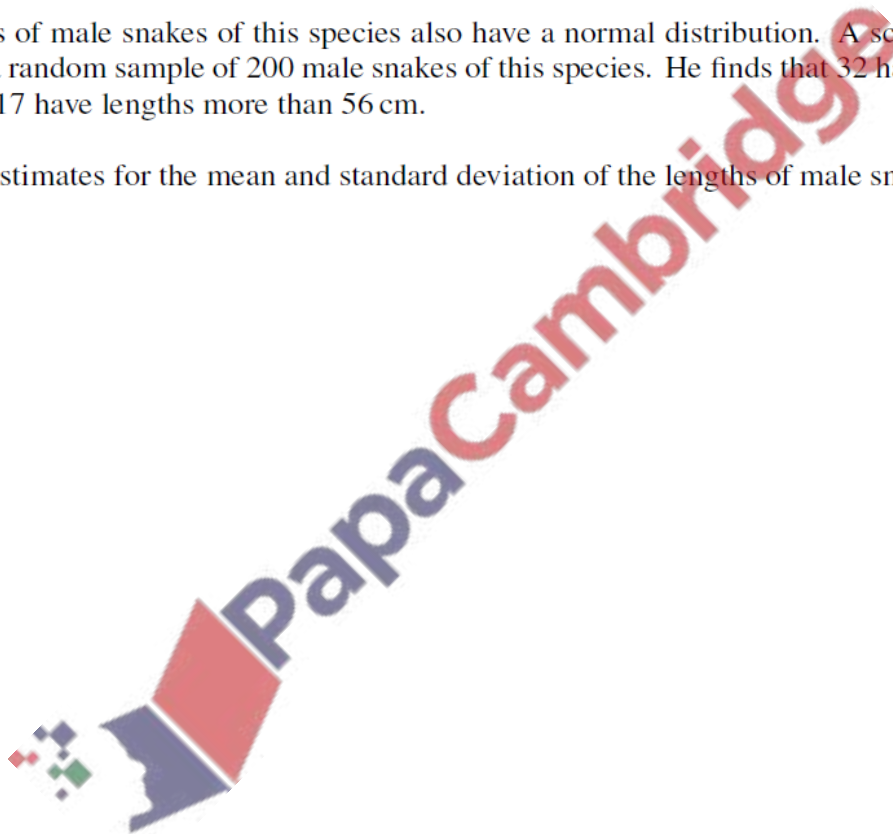
4. June/2020/Paper_9709/51/No.6

The lengths of female snakes of a particular species are normally distributed with mean 54 cm and standard deviation 6.1 cm.

- (a) Find the probability that a randomly chosen female snake of this species has length between 50 cm and 60 cm. [4]

The lengths of male snakes of this species also have a normal distribution. A scientist measures the lengths of a random sample of 200 male snakes of this species. He finds that 32 have lengths less than 45 cm and 17 have lengths more than 56 cm.

- (b) Find estimates for the mean and standard deviation of the lengths of male snakes of this species. [5]



5. June/2020/Paper_9709/52/No.4

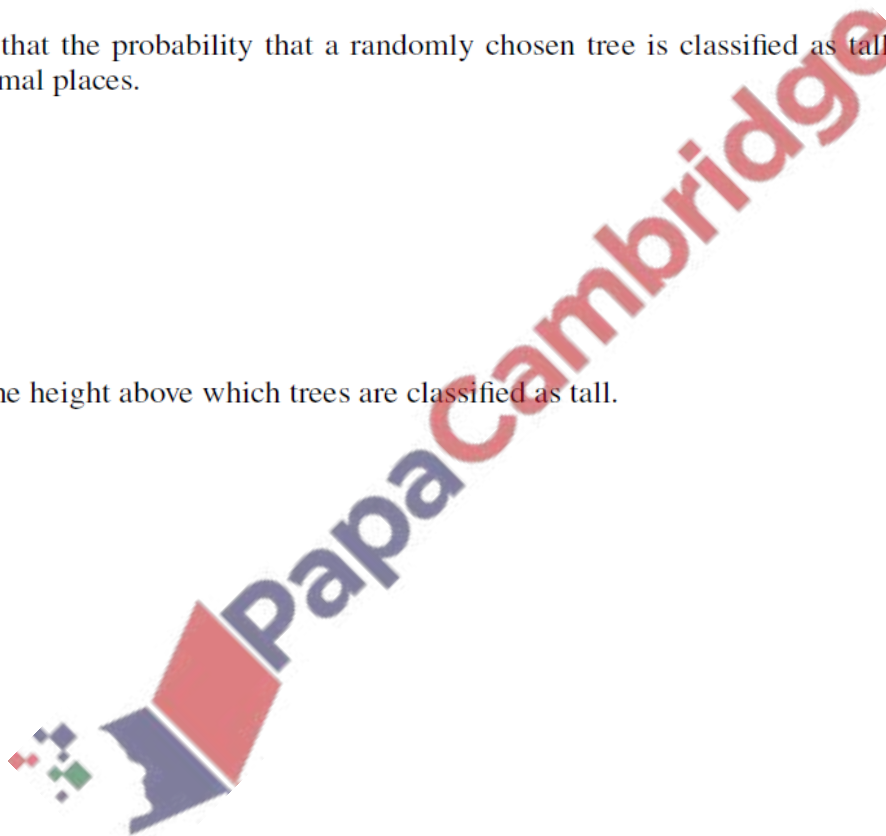
Trees in the Redian forest are classified as tall, medium or short, according to their height. The heights can be modelled by a normal distribution with mean 40 m and standard deviation 12 m. Trees with a height of less than 25 m are classified as short.

- (a) Find the probability that a randomly chosen tree is classified as short. [3]

Of the trees that are classified as tall or medium, one third are tall and two thirds are medium.

- (b) Show that the probability that a randomly chosen tree is classified as tall is 0.298, correct to 3 decimal places. [2]

- (c) Find the height above which trees are classified as tall. [3]

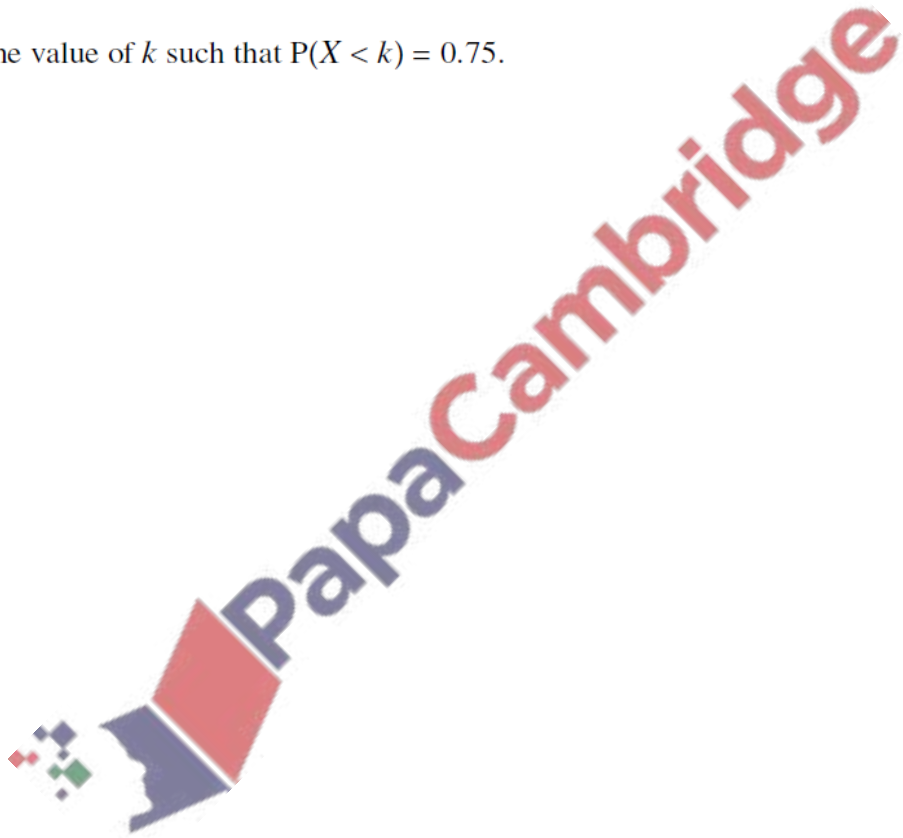


6. June/2020/Paper_9709/53/No.3

In a certain town, the time, X hours, for which people watch television in a week has a normal distribution with mean 15.8 hours and standard deviation 4.2 hours.

(a) Find the probability that a randomly chosen person from this town watches television for less than 21 hours in a week. [2]

(b) Find the value of k such that $P(X < k) = 0.75$. [3]

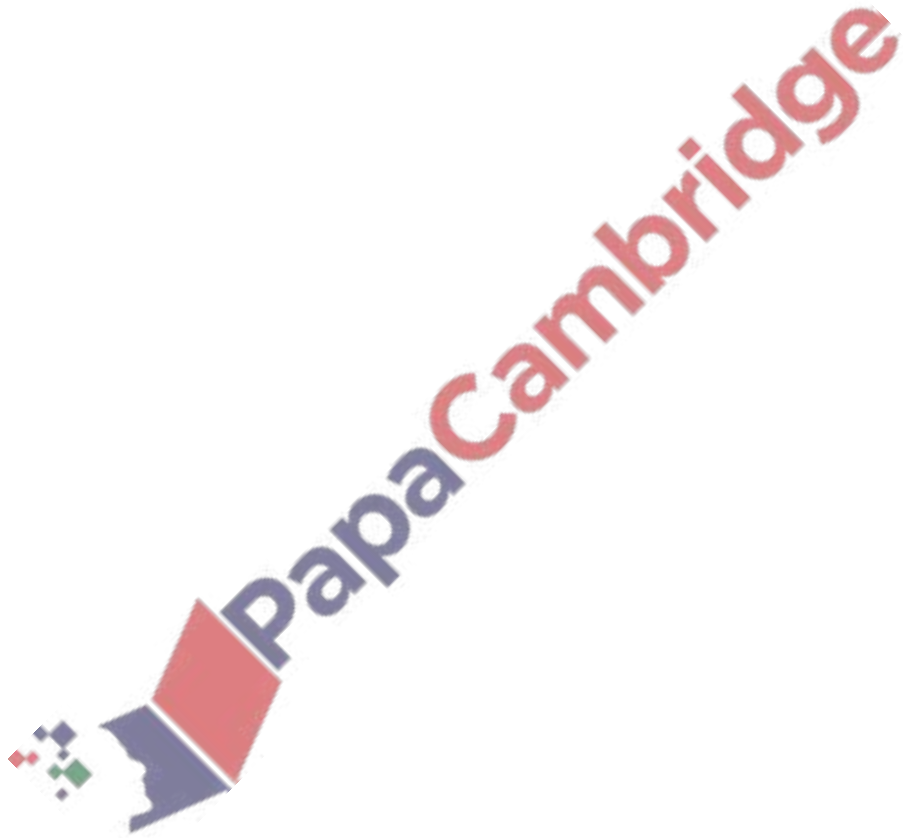


7. June/2020/Paper_9709/53/No.5d

A pair of fair coins is thrown repeatedly until a pair of tails is obtained. The random variable X denotes the number of throws required to obtain a pair of tails.

On a different occasion, a pair of fair coins is thrown 80 times.

- (d) Use an approximation to find the probability that a pair of tails is obtained more than 25 times. [5]



8. March/2020/Paper_9709/52/No.3

The weights of apples of a certain variety are normally distributed with mean 82 grams. 22% of these apples have a weight greater than 87 grams.

(a) Find the standard deviation of the weights of these apples. [3]

(b) Find the probability that the weight of a randomly chosen apple of this variety differs from the mean weight by less than 4 grams. [4]

