The normal distribution-2023 AS Mathematics 9709

1. Nov/2023/Paper_9709/51/No.3

A farmer sells eggs. The weights, in grams, of the eggs can be modelled by a normal distribution with mean 80.5 and standard deviation 6.6. Eggs are classified as small, medium or large according to their weight. A small egg weighs less than 76 grams and 40% of the eggs are classified as medium.

(a)	Find the percentage of eggs that are classified as small.	[3]
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		•••••
		•••••
(b)	Find the least possible weight of an egg classified as large.	[3]

150 of the eggs for sale last week were weighed.

(c)	Use an approximation to find the probability that more than 68 of these eggs were classified as medium. [5]
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	Q [×]

2. Nov/2023/Paper_9709/52/No.3

A factory produces a certain type of electrical component. It is known that 15% of the components produced are faulty. A random sample of 200 components is chosen.

Use an approximation to find the probability that more than 40 of these components are faulty. [5]

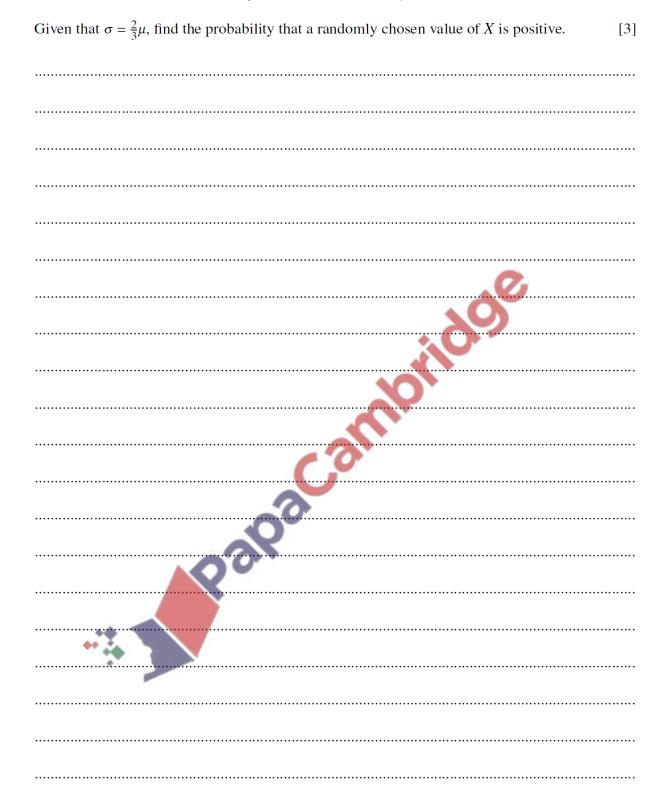
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3. Nov/2023/Paper_9709/52/No.5

- (a) The heights of the members of a club are normally distributed with mean 166 cm and standard deviation 10 cm.
 - (i) Find the probability that a randomly chosen member of the club has height less than 170 cm.

[2]

(ii)	Given that 40% of the members have heights greater than $h \text{ cm}$, find the value of h correct to 2 decimal places. [3]
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(b) The random variable X is normally distributed with mean μ and standard deviation σ .

4. Nov/2023/Paper_9709/53/No.2

The weights of large bags of pasta produced by a company are normally distributed with mean 1.5 kg and standard deviation 0.05 kg.

(a) Find the probability that a randomly chosen large bag of pasta weighs between 1.42kg and 1.52kg.
[3]

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5. Nov/2023/Paper_9709/53/No.5

The probability that a driver passes an advanced driving test is 0.3 on any given attempt.

(a) Dipak keeps taking the test until he passes. The random variable X denotes the number of attempts required for Dipak to pass the test.

	(i)) Find $P(2 \le X \le 6)$.	[2]
			(
	(ii)) Find E(<i>X</i>).	[1]
Five f	frier	ends will each take their advanced driving test tomorrow.	
			[2]
(D)]	Find	d the probability that at least three of them will pass tomorrow.	[3]

75 people will take their advanced driving test next week.

(c) Use an approximation to find the probability that more than 20 of them will pass next week. [5]

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6. March/2023/Paper_9709/52/No.6

In a cycling event the times taken to complete a course are modelled by a normal distribution with mean 62.3 minutes and standard deviation 8.4 minutes.

(a) Find the probability that a randomly chosen cyclist has a time less than 74 minutes. [2]

(b) Find the probability that 4 randomly chosen cyclists all have times between 50 and 74 minutes.

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[4]



In a different cycling event, the times can also be modelled by a normal distribution. 23% of the cyclists have times less than 36 minutes and 10% of the cyclists have times greater than 54 minutes.

[5]

(c) Find estimates for the mean and standard deviation of this distribution.

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