**Normal Distribution – 2022 AS Nov Math**

**1.** Nov/2022/Paper_9709_51/No.4

In a large population, the systolic blood pressure (SBP) of adults is normally distributed with mean 125.4 and standard deviation 18.6.

**(a)** Find the probability that the SBP of a randomly chosen adult is less than 132. [2]

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The SBP of 12-year-old children in the same population is normally distributed with mean 117. Of these children 88% have SBP more than 108.

**(b)** Find the standard deviation of this distribution. [3]

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Three adults are chosen at random from this population.

**(c)** Find the probability that each of these three adults has SBP within 1.5 standard deviations of the mean. [4]

**2.** Nov/2022/Paper_9709_53/No.2

In a large college, 32% of the students have blue eyes. A random sample of 80 students is chosen.

Use an approximation to find the probability that fewer than 20 of these students have blue eyes. [5]

**3.** Nov/2022/Paper_9709_53/No.5

Company $A$ produces bags of sugar. An inspector finds that on average 10% of the bags are underweight.

10 of the bags are chosen at random.

**(a)** Find the probability that fewer than 3 of these bags are underweight. [3]

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The weights of the bags of sugar produced by company $B$ are normally distributed with mean 1.04 kg and standard deviation 0.06 kg.

**(b)** Find the probability that a randomly chosen bag produced by company $B$ weighs more than 1.11 kg. [3]

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81% of the bags of sugar produced by company $B$ weigh less than $w$ kg.

**(c)** Find the value of $w$. [3]

**4.** Nov/2022/Paper_9709_52/No.2

The lengths of the rods produced by a company are normally distributed with mean 55.6 mm and standard deviation 1.2 mm.

**(a)** In a random sample of 400 of these rods, how many would you expect to have length less than 54.8 mm? [4]

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**(b)** Find the probability that a randomly chosen rod produced by this company has a length that is within half a standard deviation of the mean. [3]

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