1. **[ACJC H1 10 Prelims (modified)]**
The marks in H2 mathematics for a certain examination board is normally distributed with a mean of 53.2 and a standard deviation of 11.1.

   (a) Find the probability that a randomly chosen student scores below 55 marks. [1]

   A sample of 220 candidates of Tao Wan Junior College sat for this paper.

   (b) Calculate the probability that more than half of them score below 55 marks. [2]

   (c) Calculate the probability that the mean mark of this sample falls below 55. [2]

2. **[CJC 14 Prelims]**
The mass of a bar of chocolate is normally distributed with mean μ grams and standard deviation σ grams. Given that 3% of the chocolates have a mass less than 42 grams and 3% have a mass more than 48 grams,

   (a) state the value of μ and [1]

   (b) show that $\sigma = 1.5951$, correct to 5 significant figures. [1]

   (c) A random sample of 70 bars of chocolate is taken. What is the probability that the sample mean lies between 43 grams and 45 grams? [4]

3. **[NJC 14 Prelims]**
The weight in kg of a whole chicken sold in "Shop and Pay" is a random variable with a distribution $N(2.2, 0.5^2)$.

   The mean weight of n randomly chosen chickens is denoted by $\overline{C}$ kg. Given that $P(\overline{C} > 2.35) = 0.0502$, find the value of n. [3]

4. **[CJC H1 10 Prelims (modified)]**
Twelve-year old boys and girls have heights, in cm, that are assumed to be independent and normally distributed with means and standard deviations as shown in the following table.

	Mean Height	**Standard Deviation**
Boys	149	9
Girls	151	8

   One boy and two girls are chosen at random.

   (a) Find the probability that the total height of the two girls is less than twice the height of the boy. [4]

   (b) Find the probability that only one of the children has height greater than 155 cm. [4]

   A sample of n boys and a sample of 50 girls are chosen at random.

   (c) Find the least n such that the probability of the average height of the n boys exceeding the average height of the 50 girls is less than 0.1. [5]

5. **[HCI H1 10 Prelims (modified)]**
The random variable X is normally distributed with mean, $\mu = 1$ and variance, $\sigma^2 = 0.64$. The sum of 60 independent observations of X is denoted by S.

   Find $P(55 < S < 65)$. [2]

Answers

1. (a) 0.564.
   (b) 0.968.
   (c) 0.992.
2. (a) $\mu = 45$.
   (c) 0.500.
3. $n = 30$.
4. (a) 0.425.
   (b) 0.440.
   (c) Least $n = 71$.
5. 0.104.