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TUTGATHER PRACTICE PAPER

HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION 2027

MATHEMATICS Extended Part Module M1
PAPER

Question-Answer Book

Candidate Number

TUTGATHER
PRACTICE PAPER · NOT AN OFFICIAL HKEAA PAPER

1 hour 5 minutes

This paper must be answered in English

Topic practice: Applications of Normal Distribution

INSTRUCTIONS

(1) This paper consists of THREE sections, A(1), A(2) and B.

(2) Attempt ALL questions in this paper. Write your answers in the spaces provided in this Question-Answer Book. Do not write in the margins.

(3) Unless otherwise specified, all working must be clearly shown.

(4) Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.

(5) The diagrams in this paper are not necessarily drawn to scale.

(6) Calculators and mathematical drawing instruments may be used.

(7) The marks for each question are shown in brackets.

(8) No extra time will be given after the 'Time is up' announcement.

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SECTION A(1) (16 marks)

1. Let Z be a standard normal random variable. Find $P(-1.25 < Z < 0.80)$. **(3 marks)**

2. Let Z be a standard normal random variable. Find the value of c such that $P(Z > c) = 0.15$. **(3 marks)**

3. The heights of a group of plants are normally distributed with mean 35 cm and standard deviation 4 cm. Find the probability that a randomly chosen plant has height between 30 cm and 40 cm. **(4 marks)**

Answers written in the margins will not be marked.
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4. The waiting times at a bank are normally distributed with mean 8 minutes and standard deviation 2 minutes. (a) Find the probability that a randomly selected customer waits more than 10 minutes. (b) Find the probability that a randomly selected customer waits between 5 and 9 minutes. **(6 marks)**

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SECTION A(2) (24 marks)

5. The weights of apples from an orchard are normally distributed with mean 150 g and standard deviation 20 g. (a) Find the probability that a randomly selected apple weighs less than 130 g. (b) Apples are classified as "large" if their weight is in the top 10% of all apples. Find the minimum weight of a large apple. **(7 marks)**

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6. The scores in a test are normally distributed with mean 60 and standard deviation 12. (a) Find the probability that a randomly selected student scores between 50 and 75. (b) If the top 5% of students receive a distinction, find the minimum score required for a distinction. (c) If 200 students take the test, estimate the number of students who score below 45. **(8 marks)**

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7. The lifetimes of a certain type of battery are normally distributed with mean 500 hours and standard deviation 50 hours. (a) Find the probability that a randomly selected battery lasts more than 600 hours. (b) Find the probability that a randomly selected battery lasts between 450 and 550 hours. (c) A battery is considered defective if its lifetime is in the bottom 2%. Find the maximum lifetime of a defective battery. **(9 marks)**

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SECTION B (10 marks)

8. The masses of packets of sugar are normally distributed with mean μ grams and standard deviation σ grams. It is known that 10% of the packets have mass less than 490 g and 5% have mass greater than 520 g. (a) Find the values of μ and σ. (b) Find the probability that a randomly selected packet has mass between 480 g and 510 g. (c) If a packet is selected at random, find the probability that its mass is within 1.5 standard deviations of the mean. **(10 marks)**

END OF PAPER

Answers written in the margins will not be marked.

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