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TUTGATHER PRACTICE PAPER

HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION 2027

MATHEMATICS Extended Part Module M2
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 Definite Integrals

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. Find the area of the region bounded by the curve $y = x^2 - 4x + 3$ and the x-axis. **(3 marks)**

2. The region bounded by $y = \sqrt{x}$, the x-axis and the line $x = 4$ is revolved about the x-axis. Find the volume of the solid generated. **(3 marks)**

3. A particle moves along the x-axis with velocity $v(t) = 3t^2 - 6t$ m/s for $0 \leq t \leq 3$. Find the total distance travelled by the particle during this time. **(4 marks)**

Answers written in the margins will not be marked.
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4. Find the area of the region enclosed by the curves $y = x^2$ and $y = 2x - x^2$. **(6 marks)**

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SECTION A(2) (24 marks)

5. The region R is bounded by the curve $y = \sqrt{x}$, the line $x = 4$ and the x-axis. R is revolved about the line $x = 4$ to form a solid. Find the volume of the solid. **(7 marks)**

6. A tank has the shape of the solid generated by revolving the curve $y = \sqrt{x}$ for $0 \leq x \leq 4$ about the x-axis, where x and y are in metres. The tank is filled with water to a depth of 3 m. Find the work done in pumping all the water to the top of the tank. (Take the density of water as 1000 kg/m^3 and $g = 9.8$ m/s^2.) **(8 marks)**

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7. The region bounded by the curve $y = \ln x$, the x-axis and the line $x = e$ is denoted by R. **(9 marks)**

(a) Find the area of R.

(b) The region R is revolved about the y-axis. Find the volume of the solid generated.

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SECTION B (10 marks)

8. The region R is bounded by the curve $y = \sin x$ and the x-axis for $0 \leq x \leq \pi$. R is revolved about the line $y = -1$ to form a solid. Find the volume of the solid. **(10 marks)**

END OF PAPER

Answers written in the margins will not be marked.

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