TANJONG KATONG GIRLS' SCHOOL
WEIGHTED ASSESSMENT TWO
SECONDARY FOUR

CANDIDATE NAME	
CLASS	INDEX NUMBER

ADDITIONAL MATHEMATICS 4049

4 May 2026

40 minutes

Candidates answer on the Question Paper

READ THESE INSTRUCTIONS FIRST

Write your index number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.

Answer **all** questions.
If working is needed for any question it must be shown with the answer.
Omission of essential working will result in loss of marks.
The use of an approved scientific calculator is expected, where appropriate.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142, unless the question requires the answer in terms of π.

The number of marks is given in brackets [ ] at the end of each question or part question.
The total marks for this paper is 30.

For Examiner's use

Mathematical Formulae

1. ALGEBRA

Quadratic Equation

For the equation $ax^2 + bx + c = 0$,

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Binomial expansion

$$(a+b)^n = a^n + \binom{n}{1}a^{n-1}b + \binom{n}{2}a^{n-2}b^2 + \ldots + \binom{n}{r}a^{n-r}b^r + \ldots + b^n,$$

where n is a positive integer and $\binom{n}{r} = \frac{n!}{r!(n-r)!} = \frac{n(n-1)\ldots(n-r+1)}{r!}$

2. TRIGONOMETRY

Identities

$$\sin^2 A + \cos^2 A = 1$$
$$\sec^2 A = 1 + \tan^2 A$$
$$\operatorname{cosec}^2 A = 1 + \cot^2 A$$
$$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$$
$$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$
$$\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$
$$\sin 2A = 2 \sin A \cos A$$
$$\cos 2A = \cos^2 A - \sin^2 A = 2\cos^2 A - 1 = 1 - 2\sin^2 A$$
$$\tan 2A = \frac{2\tan A}{1 - \tan^2 A}$$

Formula for ΔABC

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$
$$a^2 = b^2 + c^2 - 2bc\cos A$$
$$\Delta = \tfrac{1}{2}bc\sin A$$

1 **(a)** Find $\frac{\mathrm{d}}{\mathrm{d}x}\left[\sin(x^2)+\cos^3 x+\tan x\right]$. [3]

(b) Integrate $\frac{2x^5-3\sqrt{x}}{x^2}$ with respect to x. [2]

2 **(a)** Given that $y = \ln\dfrac{x-2}{3x^2+4}$, show that $\dfrac{\mathrm{d}y}{\mathrm{d}x}$ at the point $x = 4$ is $\dfrac{1}{26}$. [3]

(b) It is also given that y is decreasing at a constant rate of 5 units per second. Using the answer from **part (a)**, find the rate of change of x with respect to time when $x = 4$ [2]

3 The function f is given by $\mathrm{f}(x) = \dfrac{e^{-x}}{x^2+1}$. Explain with mathematical working, why $\mathrm{f}(x)$ is a decreasing function, for all real values of x and $x \neq -1$. [4]

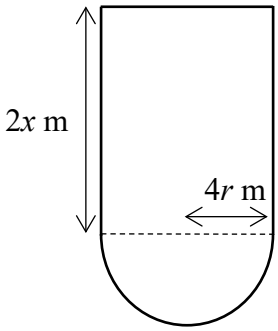
4 The equation of a curve is $y = ax + \frac{b}{x} - 1$, where a and b are constants.

The normal to the curve at the point $S(1, 3)$ is parallel to the line $x + 2y = 10$. This normal meets the curve again at point T.

(a) Show that $a = 3$ and $b = 1$. [5]

(b) Find the coordinates of point T. [4]

5 The diagram shows a piece of wire of length 64 m which is bent to form a semicircle of radius $4r$ m and a rectangle of length $2x$ m.



(a) Express x in terms of r and π. [1]

(b) Hence, show that the area, A m^2, of the figure is $256r - 32r^2 - 8\pi r^2$. [2]

(c) Given that r can vary, find the value of r which gives a stationary value of A.
Give your answer correct to 2 decimal places.

Determine whether this value of r gives a maximum or minimum value for A. [4]

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