



**UNIVERSITI KUALA LUMPUR
MALAYSIAN ITALY DESIGN INSTITUTE**

**FINAL EXAMINATION
FEBRUARY 2026 SEMESTER**

COURSE CODE : KQP 00704
COURSE NAME : MATHEMATICS 1
PROGRAMME NAME : FOUNDATION IN SCIENCE AND TECHNOLOGY
DATE : 29 JUNE 2026
TIME : 09.00 AM – 12.00 PM
DURATION : 3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please **CAREFULLY** read the instructions given in the question paper.
2. This question paper has information printed on **both sides** of the paper.
3. This question paper consists of **TWO (2)** sections; Section A and Section B.
4. Answer **ALL** questions in Section A and Section B.
5. Please write your answers for Section A on the OMR answer script and Section B in the answer booklet provided.
6. Answer all questions in English language **ONLY**.
7. Answer all calculations to (4) decimal places.
8. Formula has been appended for your reference.

THERE ARE 10 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 40 marks)

INSTRUCTION: Answer ALL questions.

Please use the objective answer sheet provided.

1. Simplify the expression below.

$$\frac{(2x^2y^{-3})^{-3}}{4x^4y^2}$$

A. $\frac{2x^2}{y^{11}}$

B. $\frac{2x^2}{y^7}$

C. $\frac{x^2}{2y^{11}}$

D. $\frac{8x^2}{y^7}$

2. Solve the equation below:

$$3^{x+2} = 9^{2x-1}$$

A. $x = 1$

C. $x = \frac{3}{4}$

B. $x = \frac{4}{3}$

D. $x = 2$

3. Evaluate
- $\log_2 16 - \log_3 27 + \ln e^5$
- .

A. 4

B. 5

C. 6

D. 7

4. Solve the logarithmic equation below.

$$\log_2(x) - \log_2(x - 2) = 3.$$

A. $x = 4$ only

B. $x = -2$ only

C. $x = 4$ and $x = -2$

D. $x = 3$

5. Make t the subject of the formula: $v = u + at^2$.
- A. $t = \frac{v-u}{a}$
- B. $t = \sqrt{\frac{v+u}{a}}$
- C. $t = \sqrt{\frac{v-u}{a}}$
- D. $\left(\frac{v-u}{a}\right)^2$
6. Find the roots of the quadratic equation $2x^2 - 5x - 3 = 0$.
- A. $x = 3, x = -\frac{1}{2}$
- B. $x = -3, x = \frac{1}{2}$
- C. $x = 1, x = -\frac{3}{2}$
- D. $x = 3, x = \frac{1}{2}$
7. Simplify the complex number expression $(3 + 4i)(2 - i)$ into algebraic form $a + bi$.
- A. $6 - 4i$
- B. $10 + 5i$
- C. $2 + 5i$
- D. $10 + i$
8. Find the remainder when the polynomial $P(x) = 2x^3 - x^2 + 3x - 5$ is divided by $(x - 2)$.
- A. 3
- B. 13
- C. -3
- D. 9
9. If $(x + 1)$ is a factor of $Q(x) = x^3 + kx^2 - x + 2$, find the value of k .
- A. $k = -2$
- B. $k = 2$
- C. $k = -4$
- D. $k = 0$

10. Decompose $\frac{5x-1}{(x-1)(x+2)}$ into its partial fractions form $\frac{A}{x-1} + \frac{B}{x+2}$. Find the values of A and B .
- A. $A = 2, B = 3$
- B. $A = 4, B = 1$
- C. $A = \frac{4}{3}, B = \frac{11}{3}$
- D. $A = 1, B = 4$
11. Given matrices $A = \begin{pmatrix} 2 & -1 \\ 3 & 4 \end{pmatrix}$ and $B = \begin{pmatrix} 0 & 2 \\ 1 & -3 \end{pmatrix}$, find $2A - B$.
- A. $\begin{pmatrix} 4 & -4 \\ 5 & 11 \end{pmatrix}$
- B. $\begin{pmatrix} 4 & -4 \\ 7 & 11 \end{pmatrix}$
- C. $\begin{pmatrix} 4 & 0 \\ 5 & 5 \end{pmatrix}$
- D. $\begin{pmatrix} 4 & -4 \\ 5 & 5 \end{pmatrix}$
12. Calculate the determinant of the matrix $M = \begin{pmatrix} 1 & 2 & 3 \\ 0 & 1 & 4 \\ 2 & 0 & 1 \end{pmatrix}$.
- A. -5
- B. 5
- C. -11
- D. 11
13. Convert $\frac{5\pi}{6}$ radians into degrees.
- A. 75°
- B. 250°
- C. 110°
- D. 150°
14. Find the reference angle for $\theta = 240^\circ$.
- A. 30°
- B. 40°
- C. 60°
- D. 120°

15. In a right-angled triangle, if $\sin \theta = \frac{3}{5}$ and θ is acute, find $\tan \theta$.
- A. $\frac{4}{5}$
B. $\frac{3}{4}$
C. $\frac{4}{3}$
D. $\frac{5}{4}$
16. Determine the length of side C in an oblique triangle ABC where $a = 7\text{ cm}$, $b = 5\text{ cm}$, and the included angle $C = 60^\circ$.
- A. $\sqrt{39}\text{ cm}$
B. $\sqrt{74}\text{ cm}$
C. 6 cm
D. $\sqrt{19}\text{ cm}$
17. Which of the following is an example of a continuous quantitative variable?
- A. The number of technical components in a storage bin.
B. The operating temperature of a mechanical engine.
C. The brand of diagnostic tools used in a workshop.
D. The breakdown frequency of an automated conveyor belt system per month.
18. Find the median of the following dataset representing weekly system downtime instances: 12,15,9,22,17,14,18.
- A. 14
B. 15
C. 16
D. 17
19. A technical production line produces items with a defect probability of 0.05. If a random sample of 10 items is selected, what is the probability that exactly 0 items are defective? (Round to 4 decimal places).
- A. 0.5987
B. 0.3151
C. 0.9500
D. 0.0500

20. The operating life of an electrical transformer follows a normal distribution with a mean of 5000 hours and a standard deviation of 400 hours. Find the Z – *score* for a transformer that lasts 5600 hours.
- A. $Z = 1.0$
 - B. $Z = 1.5$
 - C. $Z = -1.5$
 - D. $Z = 2.0$

SECTION B (Total: 60 marks)**INSTRUCTION: Answer ALL questions.****Please use the answer booklet provided.****Question 1**Find y in terms of x based on equation below:

$$y = \frac{x^8 y^3}{x^2}$$

(5 marks)

Question 2

(a) Find the solution(s) of the following equation:

$$2x + \frac{3}{x} = 5$$

(5 marks)

(b) Given that $z_1 = 8 + 21i$ and $z_2 = 10 - 7i$, find

(i) $z_1 z_2$.

(2 marks)

(ii) $3 \left(\frac{z_1}{z_2} \right)$.

(3 marks)

Question 3

- (a) The function P is defined as $P(x) = px^3 + 3x^2 - qx + 5$ where $p, q \in \mathbb{R}$. $P(x)$ is divisible by $(x - 1)$ and the remainder when $P(x)$ is divided by $(x + 2)$ is 27.

(i) Find the value of p and q .

(6 marks)

(ii) Hence, factorise $P(x)$ completely.

(4 marks)

- (b) Express the following rational function in partial fractions:

$$\frac{3x + 5}{x^2 - x - 2}$$

(5 marks)

Question 4

A load distribution analysis on a bridge support system produces the following system of linear equations based on force equilibrium:

$$3x + 4y = 35$$

$$2x + 2y = 20$$

- (a) Write this specific system of linear equations in the standard matrix form $AX = B$.

(2 marks)

- (b) Calculate the determinant of the coefficient matrix A .

(2 marks)

- (c) Determine the inverse matrix A^{-1} .

(4 marks)

- (d) Using the inverse matrix method ($X = A^{-1}B$), solve for the specific values of x and y .

(2 marks)

Question 5

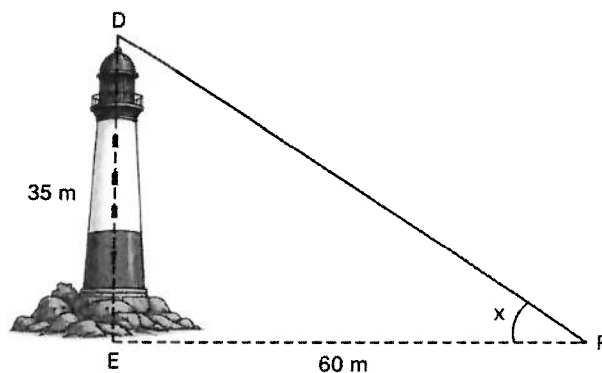


Figure 1

In Figure 1, the lighthouse (DE) is observed from point (F). The line (DF) makes an angle (x) with the horizontal ground (EF).

- (a) Calculate the value of x , giving your answer correct to **two decimal places**.
(2 marks)
- (b) Hence, determine the values of $\sin x$ and $\cos x$.
(3 marks)

Question 6

The daily expenses (in RM) of 20 university students are:

25, 30, 28, 35, 40, 32, 29, 34, 31, 33
26, 27, 36, 38, 39, 24, 37, 23, 41, 42

- (a) Construct a stem-and-leaf plot for the data above.
(5 marks)
- (b) Calculate the mean and the median of the daily expenses.
(5 marks)

Question 7

A survey shows that 25% of households in a city do not have internet access. If 20 households are selected at random, find the probability that at least two of them do not have internet access.

(5 marks)

END OF EXAMINATION PAPER

APPENDIX

Indices

$$a^m \cdot a^n = a^{m+n}$$

$$(a^m)^n = a^{mn} = (a^n)^m$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$(ab)^m = a^m b^m$$

Quadratic Formula

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

Law of Logarithms

$$\log_a xy = \log_a x + \log_a y$$

$$\log_a \frac{x}{y} = \log_a x - \log_a y$$

$$\log_a 1 = 0$$

$$\log_a a = 1$$

$$\log_a N = \frac{\log_b N}{\log_b a}$$

Measures of Location

$$\bar{x} = \frac{\sum x}{n}$$

$$\bar{x} = \frac{\sum fx}{\sum f}$$

$$Q_k = L_k + \left(\frac{\frac{k}{4}N - F_k}{f_k} \right) C_k, \quad k = 1, 2, 3$$

$$D_k = L_k + \left(\frac{\frac{k}{10}N - F_k}{f_k} \right) C_k, \quad k = 1, 2, 3, \dots, 9$$

$$P_k = L_k + \left(\frac{\frac{k}{100}N - F_k}{f_k} \right) C_k, \quad k = 1, 2, 3, \dots, 99$$

$$\text{Median} = L + \left(\frac{\frac{N}{2} - F}{f} \right) C$$

$$CV = \frac{\text{Standard deviation}}{\text{Mean}} \times 100\%$$

$$\text{Mode} = L + \frac{d_1}{d_1 + d_2} C$$

Measures of Dispersion

$$S^2 = \frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n - 1}$$

$$S_k = \frac{3(\text{mean} - \text{median})}{\text{standard deviation}}$$

$$S_k = \frac{(\text{mean} - \text{mode})}{\text{standard deviation}}$$

Probability

$$E(X) = \sum_{i=1}^n x_i P(X = x_i)$$

$$\text{Var}(X) = \sigma^2 = E[(X - \mu)^2]$$

$$\text{Var}(X) = E(X^2) - [E(X)]^2$$

Probability Distribution

$$P(X = x) = n C_x p^x q^{n-x}, \quad x = 0, 1, 2, 3, \dots, n$$

$$P(X = x) = \frac{\lambda^x e^{-\lambda}}{x!}$$

Matrix

$$A^{-1} = \frac{1}{|A|} \text{adj}(A)$$

$$x_i = \frac{|A_i|}{|A|}$$