Candidates' Performance

Module 2 (Algebra and Calculus)

Candidates generally performed better in Section A than in Section B.

Section A

Question Number	Performance in General
1	Very good. Most candidates were able to find the derivative from first principles.
2 (a)	Very good. Most candidates were able to find the first derivative and the second derivative.
(b)	Very good. A few candidates did not express y in terms of x and hence were unable to find the value of k.
3 (a)	Very good. Most candidates were able to find the indefinite integral.
(b)	Very good. Most candidates were able to find the definite integral by using the method of substitution.
4 (a)	Very good. Most candidates were able to find the indefinite integral while a few candidates wrongly thought that $\int \ln x \, dx$ was equal to $\dfrac{1}{x}$.
(b)	Very good. Most candidates were able to find the equation of Γ . However, a few candidates missed out the arbitrary constant in the answer for indefinite integral and hence they were unable to find the equation of Γ .
5 (a)	Very good. Most candidates were able to solve the system of linear equations.
(b)	Good. Many candidates were able to use (a) to solve the system of linear equations while some candidates were unable to consider the two cases ' $k = 8$ ' and ' $k \neq 8$ '.
6 (a)	Good. Some candidates were unable to use the properties that for any 3×3 real matrix M, $|M^T| = |M|$ and $|-M| = -|M|$, and hence they were unable to complete the proof.
(b) (i)	Very good. Most candidates were able to use (a) to complete the proof.
(ii)	Fair. Many candidates wrongly thought that $|A + I| = |A| + |I|$.
7 (a)	Very good. Most candidates were able to complete the proof.
(b) (i)	Very good. Most candidates were able to find the correct expression.
(ii)	Good. Many candidates were able to solve the equation but some candidates were not aware that they could use the result of (b)(i) to solve the equation.
8 (a)	Good. Some candidates were unfamiliar with trigonometric formulas and hence they were unable to complete the proof by using mathematics induction.
(b)	Fair. Many candidates wrongly put $x = \pi$ instead of $x = \dfrac{\pi}{7}$.

Section B

Question Number	Performance in General
9 (a)	Very good. Most candidates were able to find $f'(x)$.
(b)	Very good. Most candidates were able to complete the proof but a few candidates wrongly thought that the minimum value of $f(x)$ was -4 and the maximum value of $f(x)$ was 12.
(c)	Very good. Most candidates were able to write down the vertical asymptote of the graph of $y = f(x)$ while a few candidates were unable to obtain the oblique asymptote because they did not write $f(x)$ as $x + 2 + \dfrac{16}{x-2}$.
(d)	Good. Some candidates overlooked the horizontal line $y = 14$.
10 (a) (i)	Good. Many candidates were able to find the value of t.
(ii)	Fair. Only some candidates were able to find $CQ:OQ$.
(b) (i)	Good. Many candidates were able to find the area of $\triangle OAB$ but some candidates wrongly thought that the area of $\triangle OAB$ was equal to $\left| \overrightarrow{OA} \times \overrightarrow{OB} \right|$.
(ii)	Poor. Most candidates mistakenly thought that the volume of the tetrahedron $ABCD$ was $\dfrac{1}{6} \left| \overrightarrow{OD} \cdot (\overrightarrow{OA} \times \overrightarrow{OB}) \right|$. Only a few candidates were able to use the result of (a)(ii) to get the correct answer.
11 (a) (i)	Good. Many candidates were able to find $A + B$.
(ii)	Fair. Many candidates were unable to use the result of (a)(i) to complete the proof.
(iii)	Poor. Most candidates were unable to find the correct answers in (a)(i) and hence they were unable to complete the proof.
(b)	Fair. Some candidates were able to evaluate $\begin{pmatrix} 4 & 2 \\ 0 & 6 \end{pmatrix}^{315}$ by using the result of (a)(iii), while many candidates did not check whether the conditions had been fulfilled before applying the results of (a).
12 (a) (i)	Very good. Most candidates were able to find the coordinates of B.
(ii)	Good. Many candidates were able to prove that the capacity of the cup is $\pi(2h^2 - 8h + 25)$.
(b) (i)	Good. Many candidates were able to find the capacity of the cup.
(ii)	Good. Many candidates were able to find the rate of change of the depth of water but some candidates did not check whether the depth of water exceeds 3 cm before applying the result of (a)(ii).

General recommendations

Candidates are advised to:

1. show all working;

2. have more practice on integration;

3. have a thorough understanding about Gaussian elimination;

4. have more practice in manipulating trigonometric formulas;

5. have more practice in matrix operations; and

6. check whether all conditions have been fulfilled before using proved results.