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. About 70% of the candidates were able to find the derivative from first principles.
2 (a)	Very good. Over 75% of the candidates were able to expand $P(x)$ correctly, hence they were able to find the value of λ.
(b)	Good. However, some candidates were unable to observe that $P'(0)$ is the coefficient of x in the expansion of $P(x)$.
3 (a)	Good. Many candidates were able to use integration to express V in terms of t.
(b)	Good. Many candidates were able to find the required rate of change.
4 (a)	Very good. Most candidates were able to use the first derivative test to complete the proof.
(b)	Good. Some candidate mistakenly thought that the lower limit of definite integral was 0.
5 (a)	Good. However, some candidates were unable to use the induction assumption to complete the proof.
(b)	Good. Many candidates were able to use (a) to evaluate $\sum_{k=50}^{200} \frac{1}{k(k+1)}$.
6 (a) (i)	Very good. Most candidates were able to use the condition $\Delta \neq 0$ to find the range of values of α.
(ii)	Good. Many candidates were able to express y in terms of α and β correctly.
(b)	Good. Many candidates were able to use Gaussian elimination to find the range of values of β.
7 (a)	Very good. Most candidates were able to use integration by parts to find the indefinite integral.
(b)	Good. Many candidates were able to use a suitable substitution and the result of (a) to find the definite integral.
8 (a)	Fair. Some candidates were able to use the method of completing the square to prove that $h'(x) > 0$.
(b) (i)	Very good. Most candidates were able to find the equation of H.
(ii)	Good. Some candidates wrongly obtained two points of inflection.

Section B

Question Number	Performance in General
9 (a)	Very good. A small number of candidates were unable to find the equation of L because they made mistakes in finding the derivative.
(b) (i)	Good. Many candidates were able to find the point of contact by solving the system of equations.
(ii)	Good. Some candidates overlooked that $0 < x < 2$. Hence, they wrongly obtained two points of intersection.
(iii)	Poor. Most candidates were unable to write down the definite integral for the required area.
10 (a)	Very good. Over 80% of the candidates were able to use double angle formulas to complete the proof.
(b)	Good. Many candidates were able to use the result of (a) to find the definite integral.
(c)	Fair. Some candidates were able to use integration by substitution to complete the proof.
(d)	Poor. Most candidates were unable to observe that $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{1}{2(2+\cos 2x)}\right)=\frac{\sin 2x}{(2+\cos 2x)^2}$, hence they were unable to use integration by parts to get the correct answer.
11 (a)	Very good. Over 80% of the candidates were familiar with the matrix operations, and hence they were able to find the values of a and b .
(b)	Fair. Many candidates were unable to use mathematical induction to complete the proof.
(c)	Poor. Most candidates were unable to use the result of (b) to find $(M^n)^{-1}$.
12 (a)	Very good. About 80% of the candidates were able to find the value of t .
(b)	Good. Many candidates were able to find the required cross product. Some candidates were unable to obtain the correct answer because the value of t in (a) was incorrect.
(c)	Good. Many candidates were able to use the formula $\frac{1}{6}\left\lvert\overrightarrow{OA}\cdot(\overrightarrow{AB}\times\overrightarrow{AC})\right\rvert$ to find the required volume.
(d) (i)	Poor. Most candidates were unable to use the result of (c) to deduce that O does not lie on Π .
(ii)	Poor. Most candidates were unable to use the result of (b) to find $\overrightarrow{OD}$.
(iii)	Poor. A small number of candidates were able to point out the fact that D, E and O are collinear but most of them were unable to give a correct explanation.