

UNIVERSITY OF MALTA

**THE MATRICULATION EXAMINATION
INTERMEDIATE LEVEL**

PURE MATHEMATICS

May 2016

EXAMINERS' REPORT

**MATRICULATION AND SECONDARY EDUCATION
CERTIFICATE EXAMINATIONS BOARD**

**Pure Mathematics
Intermediate Level
May 2016**

Part 1: Statistical Information

The distribution of grades awarded in the May 2016 session is given in the table below.

GRADE	A	B	C	D	E	F	abs	TOTAL
NUMBER	35	66	133	112	96	137	38	617
% OF TOTAL	5.7	10.7	21.6	18.2	15.6	22.2	6.2	100

Part 2: Comments regarding candidate's performance

Q1: Parts (a) and (b) were poorly answered by a significant number of candidates. The following were frequent errors which appeared across these two parts of the question:

- (i) $\ln(20) = -5t \ln(30e)$
- (ii) $\log(a - b) = \log a - \log b$
- (iii) $\log_3\left(\frac{9x-2}{x^2}\right) = 2 \Rightarrow \frac{9x-2}{x^2} = 2$ instead of 3^2 .

Part (c) was very well done by most candidates. A small number of candidates quoted the correct answer without showing any working.

Q2: This question was fairly well attempted. In part (a), most candidates used the correct formula for finding the value of k , that is the sum of the roots = $-b/a$, but due to silly mistakes, like for instance $16k = 6 \Rightarrow k = 8/3$, or $-(2k + 1) = 1 - 2k$, the value of k and the product of the roots were incorrect.

Part (b) was very well answered. Most candidates found the correct factors of $p(x)$ and sketched the curve correctly. In part (iv), the range produced many answers like $-1 < x < 1$, which are obviously incorrect.

Q3: This was well attempted by many candidates. Most candidates found no difficulties in finding the correct partial fractions. The only difficulty was in the integration of $\frac{2}{(1+x)^2}$. A noticeable error was the direct substitution of the limits of integration in the partial fractions without integrating first.

Q4: This question was rather poorly answered. In part (a), many candidates found the number of integers which are divisible by 5, that is 100 then went on to find the S_{400} instead of finding $S_{500} - S_{100}$.

In part (b), the majority of candidates found the first part straight forward, but in the second part many confused even *terms* with even *numbers* and concluded that the sum of the *even terms* is zero.

Q5: Part (a) was very well answered by a good number of candidates, who managed to obtain full marks for this part.

Part (bi) proved to be more difficult than expected. There was a fair amount of confusion in finding the area of a *sector*. Working in degrees when it was clearly stated that Θ is in radians, and using the incorrect formula $\frac{\pi}{180}r\theta$ for the area of a sector, made things more difficult for many of the students.

Part (bii) showed clearly that the students did not have much practice in using the trial and error method to solve transcendental equations.

Q6: a) This part was quite well attempted, although some candidates found it difficult to express the probability statements correctly.

b) The main difficulty in this part was the selection of the fifth member of the committee. Few candidates indicated that any one of the remaining fourteen students could be selected as the fifth member of the committee.

c) The binomial expansion was correctly obtained by a good number of candidates. A common error was that the correct value of $x = 0.01$ was not applied to obtain the final result.

Q7: a) Some candidates did not apply the product and quotient formulae for differentiation correctly. Besides, the results for this part were not expressed in the simplest form in a number of cases.

b) Part (i) was correctly worked by those candidates who attempted it, but some candidates did not use the correct coordinates of the point to obtain the equation of the tangent.

Q8: a) This part was attempted by most candidates, but the final result was not expressed correctly in most cases.

b) Most of the candidates who drew the correct sketch then proceeded to work the integral correctly to obtain the final correct result

Q9: a) The candidates who attempted part (i) obtained the matrices A and B correctly. The matrix products of part (ii) were correctly worked in most cases, but the interpretations offered by most candidates in part (iii) were not appropriate.

b) Most of the candidates used the method of matrix inverse correctly leading to the correct results. Some candidates tried to solve the system of equations as the solution of simultaneous equations.

Q10: Part (i) was done correctly by most of the candidates who attempted it. Few candidates followed the instruction suggested in part (ii) correctly to obtain the values of the constants a , b and c . Very few candidates used part (ii) to obtain the required inverse matrix.