

Feedback on MATH10131 Calculus and Vectors, January 2019

ILO1 Represent complex numbers in the complex plane and use them to relate trigonometric and exponential functions.

ILO2 Sketch polynomial, rational, inverse and some standard functions of a single variable in Cartesian and polar coordinates.

ILO3 Evaluate and interpret limits and derivatives of algebraic functions, including those expressed in implicit/parametric form.

ILO4 Select and deploy methods for evaluating integrals of functions of a single variable.

ILO5 Construct and manipulate Taylor series of scalar functions of one and two variables.

ILO6 Manipulate vectors using tools such as scalar and vector products, deploying these quantities to solve geometric problems.

ILO7 Construct, deploy and interpret derivatives of scalar functions of more than one variable.

ILO8 Construct, evaluate and interpret simple integrals of functions of two variables, using tools such as the Jacobian and Green's theorem Construct and evaluate line integrals.

ILO9 Locate and classify extrema of functions of two variables.

Question A1

Learning Outcome	Feedback
ILO1	Testing ILO1 at a medium level. Majority of students achieved ILO1, and scored full marks. The standard error was to place the centre of a circle in the wrong place. [correct answer 2 marks]

Question A2

Learning Outcome	Feedback
ILO2	Testing ILO2 at a medium level. As in the previous years, graph sketching was either done well with the strong candidates got full marks while some candidates scored no marks at all. [correct answer 4 marks]

Question A3

Learning Outcome	Feedback
ILO2	Testing ILO2 at a medium level. Most students found the correct formula for the inverse function but unfortunately some had problems with the domain and range of the inverse function. They incorrectly sketched the graph of the inverse function by using a wrong domain for it. [correct answer 4 marks]

Question A4

Learning Outcome	Feedback
ILO3	Testing ILO3 at a medium level. Done well because this question was closely related to a bookwork. Most candidates knew how to do it, even though some details were not right. [correct answer 4 marks]

Question A5

Learning Outcome	Feedback
ILO3	Testing ILO3 at a medium level. Part (a): no problems at all. Regarding part (b), it was difficult question only done correctly by few students. A large number of candidates incorrectly applied the L'Hospital's Rule.

[correct answer 4 marks]

Question A6

Learning Outcome**Feedback****ILO3**

Testing ILO3 at a medium/high level. Done well. Majority of students achieved ILO3, and scored highly.

[correct answer 4 marks]

Question A7

Learning Outcome**Feedback****ILO4**

Testing ILO4 at a medium level. In general, it was well answered. Most candidates got full marks for this question.

[correct answer 4 marks]

Question A8

Learning Outcome**Feedback****ILO5**

Testing ILO5 at a high level. Done reasonably well, although many students made wrong calculations of the Taylor series coefficients.

[correct answer 4 marks]

Question A9

Learning Outcome**Feedback****ILO6**

Testing ILO6 at a high level. Generally this question was done well. There was a common mistake made by many candidates who made the wrong calculations to find the plane that passes through the three points.

[correct answer 6 marks]

Question A10

Learning Outcome**Feedback****ILO6**

Testing ILO6 at high level. It was done reasonably well. Marks were deducted for mistakes in finding the vector along the line defined by symmetric equations.

[correct answer 6 marks]

Question A11

Learning Outcome**Feedback****ILO8**

Testing ILO8 at high level. There are two common mistakes: 1) range of y is wrong, even the graph is right 2) many students incorrectly reverse the order of integration.

Question A12

Learning Outcome**Feedback****ILO8**

Testing ILO8 at a medium level. Done well. There were two common mistakes. When candidates get $r = 6 \cos(\theta)$, then they use $r = 6$ when integrating. Candidates used a wrong integration limit 2π .

[correct answer 8 marks]

Question A13

Learning Outcome**Feedback****ILO8**

Testing ILO8 at a medium level. Generally this question was done well.

[correct answer 5 marks]

Question A14

Learning Outcome**Feedback****ILO7**

Testing ILO7 at high level. It was reasonably well answered.

[correct answer 6 marks]

Question A15

Learning Outcome**Feedback****ILO7 ILO9**

Testing ILO7 and ILO9 at a medium level. Majority of students achieved ILO7 and ILO9. A few student made a mistake at the last step to identify a maximum, minimum or saddle. They incorrectly calculated D.

[correct answer 6 marks]