



AUM

American University Of The Middle East

Academic Year: 2020/2021

Semester:

Summer Online 2

Course Information

Course Code:	MAT175	Section:	O1
Instructor Name:	Dr. Alper Bulut		

Assignment Information

Assignment Type:	Final Assessment 20%
Due Date:	September 27 , 2020 8:00 A.M
Number of Questions:	4
Number of Pages:	4

Earned Mark

/ 100

Student Information:

Student 1	Name:	ID:
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Regulations:

- It is an individual assessment.
- Solve all the questions. Show all your work.

Q1] An epidemiologist determines that a particular epidemic spreads in such a way that t weeks after the outbreak, N hundred new cases will be reported,

where $N(t) = \frac{5t}{27+t^2}$

- a. Find $N'(t)$ and $N''(t)$ [10 pts]
- b. At what time is the epidemic at its worst? [10pts]
- c. What is the maximum number of reported new cases? [5 pts]
- d. Health officials declare the epidemic to be under control when the rate of reported new cases is minimized. When does this occur? What number of new cases will be reported at that time? [10 pts]
- e. What will be the number of the new cases in the long run that is as t goes to infinity? [5pts]

Q2] Find all coefficients (a , b , and c) in $f(x) = ax^2 + bx + c$ such that $f(0) = 1$, $f'(-1) = 8$, and $f''(x) = 4$. [10 pts]

Q3]

- a. Find derivative of $f(x)$ at $x = 0$, where $f(x) = \sqrt{(x+2)e^{(x^2-2x+3)^2}}$

Note: e is the Euler number. [10 pts.]

- b. Find derivative of $g(x)$ at $x = 0$, where $g(x) = (x^2 - x + 1)\sqrt{x^3 - x + 1}$
[10 pts.]

- c. Find the equation of the tangent line to $h(x) = \frac{f(x)}{g(x)} = \frac{\sqrt{(x+2)e^{(x^2-2x+3)^2}}}{(x^2-x+1)\sqrt{x^3-x+1}}$ at the point $x = 0$. [10 pts.]

Q4] $f(x) = \frac{3x^2 - 3x - 6}{2x^3 + 2x^2 - 12x}$

- a. Find all vertical asymptotes. [10 pts.]
- b. Find all horizontal asymptotes. [10 pts.]