



COURSE DETAILS:

ORIENTATION MATHEMATICS I		MATH 001	MAJOR EXAM II A
Semester:	Fall Semester --Term 181		
Date:	Sunday November 25, 2018		
Time Allowed:	90 minutes		

STUDENT DETAILS:

Student Name:	
Student ID Number:	
Section:	
Instructor's Name:	

INSTRUCTIONS:

- You may use a scientific calculator that does not have programming or graphing capabilities. NO borrowing calculators.
- NO talking or looking around during the examination.
- NO mobile phones. If your mobile is seen or heard, your exam will be taken immediately.
- Show all your work and be organized.
- You may use the back of the pages for extra space, but be sure to indicate that on the page with the problem.

GRADING:

	Page 1	Page 2	Page 3	Page 4	Page 5	Total	Total
Questions							
Marks	10	10	20	20	20	80	20

1) The equation $x^2 + x + 1 = 0$ has:

- A) Three real solutions
- B) One real solution
- C) Two real solutions
- D) Two complex solutions

2) i^{82} is equal to which of the following:

- A) i
- B) $-i$
- C) -1
- D) 1

3) The complex conjugate of $3 + 4i$ is:

- A) $-3i + 4$
- B) $-3 + 4i$
- C) $3 - 4i$
- D) $-3 - 4i$

4) The solution of the inequality $3x + 13 < 7$ is:

- A) $(-\infty, -2)$
- B) $(-\infty, 3)$
- C) $(-\infty, 2)$
- D) $(-2, \infty)$

5) Solve the equation $|x + 1| = 0.5$

- A) $x = 1.5$ and $x = 0.5$
- B) $x = -0.5$ and $x = -1.5$
- C) $x = \pm 0.5$
- D) $x = -0.5$

You must write the correct answer to each question in the box below

Question	1	2	3	4	5
Answer					

6) The solution of the inequality $6 \leq x + 9 < 8$ is:

- A) $[6, 7)$
- B) $[-3, -1)$
- C) $[-7, -6)$
- D) $[1, 3)$

7) The solution of the absolute value inequality $|x^2 - 4| > -3$ is:

- A) $(-2, 2)$
- B) $(-\infty, \infty)$
- C) $(-\infty, -3) \cup (3, \infty)$
- D) $[-2, 2]$

8) If $h(x) = \sqrt{x^2 + 3}$ can be written as a composition $(f \circ g)(x)$, then:

- A) $f(x) = x + 3$ and $g(x) = \sqrt{x^2}$
- B) $f(x) = x^2 + 3$ and $g(x) = \sqrt{x}$
- C) $f(x) = \sqrt{x}$ and $g(x) = x^2 + 3$
- D) $f(x) = x + 3$ and $g(x) = \sqrt{x + 3}$

9) If $f(x) = \sqrt{x^2 - 5}$ and $g(x) = \frac{1}{x-1}$, then $(f + g)(3)$ is given by:

- A) $\frac{5}{2}$
- B) $\frac{1}{6}$
- C) $\frac{11}{5}$
- D) $\sqrt{3}$

10) The graph of $f(x + 2) - 1$ can be obtained from the graph of $f(x)$ by:

- A) Shifting 2 units up and 1 unit left
- B) Shifting 2 units right and 1 unit down
- C) Shifting 2 units left and 1 unit up
- D) Shifting 2 units left and 1 unit down

You must write the correct answer to each question in the box below

Question	6	7	8	9	10
Answer					

Q11) (4+4+4 pts) Solve the following equations:

a) $x^2 - 3x - 18 = 0$

b) $x^4 + 64x = 0$

c) $\sqrt{x+2} = x$

Q12) (4+4 pts) Solve the following inequalities:

a) $7 < 5x + 12 \leq 32$

b) $|7x - 2| > 8$

Q13) (6 pts) Express $\frac{\sqrt{-8}}{1+\sqrt{-2}}$ in standard form $a+bi$. **Show all your steps.**

Q14) (4 pts) Solve the absolute value equation $|3-4x|+8=12$

Q15) (6 pts) Consider the piecewise defined function $f(x) = \begin{cases} x & \text{if } x \leq 0 \\ x-3 & \text{if } x > 0 \end{cases}$

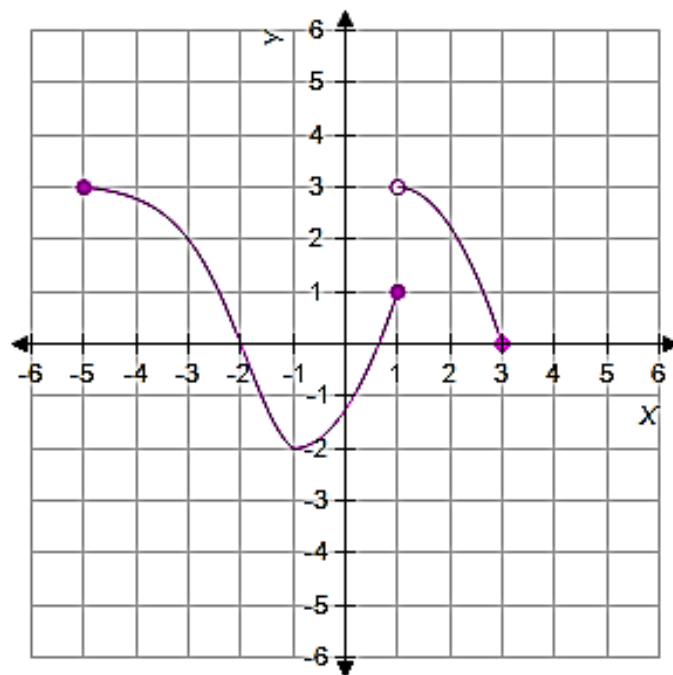
a) Evaluate $f(-1)$, $f(0)$, $f(1)$ and $f(2)$

b) Sketch the graph of the piecewise defined function.

Q16) (4 pts) Find the average rate of change of $f(x) = x^3 - 6x^2$ between $x=0$ and $x=2$.

Q17) (12 pts) The graph of a function $g(x)$ is given. Find the following:

- a) The domain of $g(x)$.
- b) The range of $g(x)$.
- c) The value of $g(-3)$.
- d) The value of $g(1)$.
- e) The coordinates of the local minimum of $g(x)$.
- f) The interval(s) on which $g(x)$ is decreasing?



Q18) (8 pts) Consider the function $g(x) = -\sqrt{x-3} + 1$

- a) Find the domain of $g(x)$
- b) Use transformations of the graph of $f(x) = \sqrt{x}$ to sketch the graph of $g(x) = -\sqrt{x-3} + 1$
- c) Find $g^{-1}(x)$, the inverse of $g(x)$.