

Name:

Recitation Instructor, Day, Time:

TRADITIONAL MATH 100 – Exam 2 – October 2016

Directions: You will find 16 problems listed below. SHOW ALL WORK! No notes/books/friends are allowed. Graphing calculator models above the level of a TI-84 plus are not allowed. You have one hour to complete this exam.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL

1. (6 points) Find the solutions and check your answers: $13 + |x + 7| = 25$.

2. (6 points) Find the solutions to $x^2 + 10x - 2 = 0$.

3. (6 points) Solve the quadratic inequality $x^2 + 7x < 8$.

4. (6 points) Given that $x = 6$ is one zero of $p(x) = x^3 - 216$, find all the other zeros, real or complex, of $p(x)$.
5. (6 points) Suppose a rational function has poles at $x = -7$ and $x = 1$, zeros at $x = 4$ and $x = -2$, and a horizontal asymptote $y = 5$. Find a possible rational function that has such attributes.
6. (6 points) Find the quotient and remainder when $p(x) = 4x^3 - 3x^2 + 1$ is divided by $x^2 + x + 5$. Write $p(x)$ in the form $d(x)q(x) + r(x)$, where $d(x)$, $q(x)$ and $r(x)$ are the divisor, quotient and remainder, respectively.

7. (6 points) The profit function for selling x units of a certain product is given by $P(x) = -x^2 + 600x + 4800$. What number of units generates maximum profit, and, what is the maximum profit? Show your work with algebra. **Remember to answer both parts of the question.**

8. (6 points) Simplify and write in standard $a + bi$ form: $(-6 + 3i)(9 - 4i)$

9. (8 points) Consider the polynomial $p(x) = (3x - 2)(x + 1)(2 - x)(x + 5)$. Circle TRUE or FALSE for each of the statements below.

(a) TRUE FALSE $p(x)$ has even degree.

(b) TRUE FALSE $p(x)$ has a negative y-intercept.

(c) TRUE FALSE $p(x)$ has positive leading coefficient.

(d) TRUE FALSE As $x \rightarrow \infty$, $p(x) \rightarrow \infty$.

10. (8 points) A parabola has vertex at $(1, 7)$ and passes through the point $(3, 4)$. What is the equation of the parabola? Write your answer in the form $y = ax^2 + bx + c$.

11. (4 points) Using the **REMAINDER THEOREM**, find $p(-1)$ when $p(x) = 5x^4 - 3x^2 + x + 7$. Be sure to identify your final answer.

12. (6 points) Simplify i^{2441} .

13. (6 points) Solve: $|2x - 1| < 9$.

14. (6 points) Solve: $|2x + 5| > 3$.

15. (8 points) Consider the parabola $f(x) = (x - 4)^2 - 7$. Answer the following questions. (Drawing a quick sketch of the graph of $f(x)$ may help you.)

(a) What is the domain of $f(x)$?

(b) What is the vertex of $f(x)$?

(c) What is the range of $f(x)$?

(d) What is the axis of symmetry of $f(x)$?

16. (6 points) Find all the zeros of $p(x) = x^4 - 13x^2 + 36$.