Name:
Recitation Instructor, Day, Time:

TRADITIONAL MATH 100 – Exam 2 – March 2016

Directions: You will find 14 problems listed below. 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.

Page 1 20 pts.	Page 2 20 pts.	Page 3 20 pts.	Page 4 20 pts.	Page 5 20 pts	TOTAL 100 pts

1. (6 points) Find the solutions and check your answers: $8 - 2|x + 5| = 12$.

2. (6 points) Find the solutions to $3x^2 - x - 8 = 0$.

3. (8 points) Solve the quadratic inequality $x^2 + 5x < 6$.

4. (8 points) In a controlled lab environment, some organisms exhibit constant growth over a specific time period. Suppose a certain organism starts out weighing 1 mg, and grows to 11 mg over a 20 hour time period. Find a linear model (in other words, find a linear function) that describes the growth of the organism for $0 \leq t \leq 20$ hours.

5. (6 points) Find an equation of the line passing through $(-2, 7)$ and parallel to $x + 4y = 3$.

6. (6 points) Find the quotient and remainder when $p(x) = 5x^3 - 2x + 1$ is divided by $x^2 + 3x - 5$. 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. (5 points) Suppose the number of vehicle thefts in a given area, from the years 1960 to 1990, could be modeled by the polynomial $p(x) = 30.97x^3 - 1266.9x^2 + 19199x + 29,130$, where x is the number of years since 1960. What is $p(0)$, and what is its meaning in context of the model? Explain in a brief sentence.

8. (5 points) Find the vertex of the quadratic function $C(x) = x^2 - 400x + 6200$. Is the vertex a maximum or minimum, and how do you know?

9. (10 points) Consider the polynomial $p(x) = -4x^4 - 6x^3 + 2x + 400$. Circle TRUE or FALSE for each of the statements below.

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

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

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

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

   (e) TRUE FALSE As $x \to -\infty$, $p(x) \to \infty$.

10. (8 points) A parabola has vertex at $(5, 4)$ and passes through the point $(-6, 1)$. What is the equation of the parabola? Write your answer in the form $y = ax^2 + bx + c$.

11. (6 points) Using the **REMAINDER THEOREM**, find $p(3)$ when $p(x) = 4x^4 + x^2 - x + 3$. Be sure to identify your final answer.

12. (6 points) Consider two quadratic functions given by $f(x) = 2x^2 - 11x + 12$ and $g(x) = x^2 - 3x + 5$. Find the intersection points of these two parabolas and state your answers as ordered pairs.

13. (6 points) Solve: $|4x - 3| < 8$.

14. (6 points) Solve: $|2x - 7| > 4$.

15. (8 points) Consider the parabola $f(x) = (x + 2)^2 + 5$. 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 $f(x)$?