Name:
Recitation Instructor, Day, Time:

TRADITIONAL MATH 100 – Exam 2 – Summer 2017

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: $3 + 4|x + 6| = 15$.

2. (6 points) Find the solutions to $3x^2 + 5x - 7 = 0$.

3. (8 points) Solve the quadratic inequality $x^2 + 3x > 0$.

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 29 mg over a 4 hour time period. Find a linear function that describes the growth of the organism for $0 \leq t \leq 4$ hours.

5. (6 points) Find an equation of the line passing through $(2, 4)$ and perpendicular to $x - y = 10$.

6. (6 points) Find the quotient and remainder when $p(x) = 2x^3 - x + 1$ is divided by $x^2 + x - 3$. 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. (10 points) The cost function $C(x) = 2x^2 - 100x + 82000$ describes the cost, in dollars, of making x units of a certain product.

   (a) What is the vertex of this quadratic function? Show your work with algebra. If you choose to use a graph as part of your work, you must include a graph having the pertinent information that helps to answer this question.

   (b) Interpret the meaning of the vertex in context of the situation.

8. (10 points) Consider the polynomial $p(x) = 6x^8 - 7x^2 + 2x - 200$. 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 $x \to \infty$, $p(x) \to \infty$.

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

9. (8 points) A parabola has vertex at $(0, 2)$ and passes through the point $(-2, 5)$. What is the equation of the parabola? Write your answer in the form $y = ax^2 + bx + c$.

10. (6 points) Using the **REMAINDER THEOREM**, find $p(3)$ when $p(x) = x^4 - 3x^2 + 6x - 10$. Be sure to identify your final answer.

11. (6 points) Two parabolas have functions given by $f(x) = -x^2 + 2x$ and $g(x) = x^2 + 7x + 2$. Find the intersection points of the two parabolas and state your answers as ordered pairs.

12. (6 points) Solve: $|3x - 4| > 15$.

13. (6 points) Solve: $|2x - 1| < 11$.

14. (8 points) Consider the parabola $f(x) = -(x+3)^2 + 4$. 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 $f(x)$?