

Name:

Recitation Instructor, Day, Time:

TRADITIONAL MATH 100 – Exam 2 – March 2016

Directions: You will find 15 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: $8 - 2|x + 15| = -18$.

2. (6 points) Find the solutions to $2x^2 - x - 9 = 0$.

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

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 9 mg over a 48 hour time period. Find a linear model (in other words, find a linear function) that describes the growth of the organism for $0 \leq t \leq 48$ hours.
5. (6 points) Find an equation of the line passing through $(9, -1)$ and parallel to $x + 3y = 2$.
6. (6 points) Find the quotient and remainder when $p(x) = 2x^3 - x + 3$ 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. (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 $p(1)$, 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 $C(x) = x^2 - 200x + 1200$. Is the vertex a maximum or minimum, and how do you know?
9. (10 points) Consider the polynomial $p(x) = -4x^3 - 12x^2 + 2x + 400$. Circle TRUE or FALSE for each of the statements below.
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|-----|------|-------|--|
| (a) | TRUE | FALSE | $p(x)$ has odd degree. |
| (b) | TRUE | FALSE | $p(x)$ has a negative y-intercept. |
| (c) | TRUE | FALSE | $p(x)$ has positive leading coefficient. |
| (d) | TRUE | FALSE | As $x \rightarrow \infty$, $p(x) \rightarrow \infty$. |
| (e) | TRUE | FALSE | As $x \rightarrow -\infty$, $p(x) \rightarrow \infty$. |

10. (8 points) A parabola has vertex at $(7, 2)$ and passes through the point $(4, 1)$. 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 $p(-1)$ when $p(x) = 2x^4 + x^2 - 3x + 4$. 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: $|5x - 4| < 9$.

14. (6 points) Solve: $|3x - 1| > 6$.

15. (8 points) Consider the parabola $f(x) = -(x + 3)^2 - 1$. 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 $f(x)$?