Name:
Recitation Instructor, Day, Time:

TRADITIONAL MATH 100 – Exam 2 – Fall 2021

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

2. (6 points) Solve $|7x + 6| < 5$

3. (8 points) Sketch a graph and use it to solve the quadratic inequality $x^2 - 25 < 0$.

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 2 mg, and grows to 18 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 $(2, -3)$ and parallel to $4x - y = 1$.

6. (6 points) Solve: $|2x + 3| - 4 > 5$

7. (10 points) Consider the polynomial $p(x) = 13x^4 - 16x^2 + x - 400$. 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 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 $x \to -\infty$, $p(x) \to \infty$.

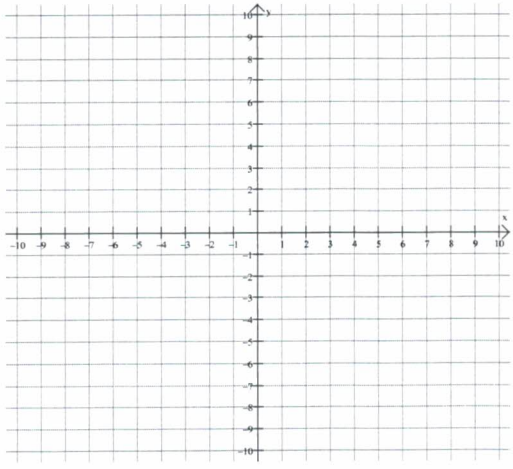
8. (12 points) Consider two quadratic functions given by $f(x) = x^2 - x - 5$ and $g(x) = -2x^2 + 2x + 13$. Find the intersection points of these two parabolas and state your answers as ordered pairs.

9. (6 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 $p(7)$, and what is its meaning in context of the model? Explain in a brief sentence.

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

11. (6 points) Find the vertex of the quadratic function $C(x) = x^2 - 8x + 12$. Is the vertex a maximum or minimum, and how do you know?

12. (6 points) Graph: $f(x) = |x - 1| - 2$. Include all intercepts and at least 6 points on your graph.



13. (6 points) Solve: $||x - 2| - 24| = 4$.

14. (8 points) Consider the parabola $f(x) = -(x + 1)^2 + 3$. 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 $f(x)$?