

## **Exam 2 – Practice 1 Math 110.**

**Exam Guidelines** This is an in-class, written exam with a 75-minute time limit.

- **Permitted Materials:** You may use a basic calculator and formula sheets.
- **Formula Sheet Restrictions:** Your sheets must contain formulas only; no examples or worked problems are permitted. All sheets will be inspected at the start of the exam.
- **Prohibited Items:** Phones and all other smart devices are strictly forbidden.
- **Academic Integrity:** The use of AI is prohibited. Any AI usage will result in an automatic F for the exam and may lead to failing the entire course.
- Show **ALL** your work for credits.

1. Solve each quadratic by factoring or the quadratic formula.

a.  $2x^2 = 4x$

b.  $x^2 - 6x + 10 = 0$

c.  $x^2 - 6x + 9 = 0$

d.  $x^2 + 7x = -10$

2. Graph of the quadratic functions. Label the vertex and another point.

a.  $y = x^2 + 2x + 3$

b.  $y = -2x^2 + 4x + 4$

3. Suppose that in a monopoly market the total cost per week of producing a high-tech product is given by  $C = 3600 + 100q + 2q^2$ . Suppose further that the sales price function for this product is

$$p = 500 - 2q.$$

- a. Find the revenue function in term of q.
- b. Find the number of units that will **maximize the revenue**.
- c. Find the profit function
- d. Find the number of units that will give **break-even** for the product
- e. Find **the maximum profit** and the number of products need to maximize the profit.

- f. Graph the revenue function and the cost function label the break-even points, fixed cost, and the maximized profit point.
4. On a certain route, an airline carries 8000 passengers per month, each paying \$50. A market survey indicates that for each \$1 increase in the ticket price, the airline will lose 100 passengers.
- What is the airline's current revenue?
  - Create an income (revenue) function if " $x$ " is defined as the number of \$1 price increases
  - Find the number of \$1 price increases that will maximize the revenue.
  - Find the new ticket price (that will maximize the revenue)
  - Find the number of passengers at that price in d.
  - Find the new maximum income (income at that price in d)

5. If the supply function for a commodity is given by  $p = 10q^2 + 2q$  and the demand function is given by  $p = 150 - 6q^2$ , find the point of market equilibrium (Supply equals Demands).