** Cholkar MCHS MATH II \_\_\_/\_\_\_/\_\_\_ Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| U2L1INV2 | What are the solution possibilities for quadratic inequalities?How can solution strategies for quadratic equations be applied to solution of inequalities? |
| HW #  | Complete Handout **[1b, 1c, 2, 4]** |
| Do Now | Use symbolic reasoning to find all solutions for these equations. Illustrate each solution by a sketch of the graphs of the functions involved, labeling key points with their coordinates.a. b.  |

 **INVESTIGATION: QUADRATIC INEQUALITIES (Adapted from Core Plus Course 3 pg. 112)**

***My role for this investigation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

1. Consider the inequality 

 a. Which of these diagrams is most like what you would expect for a graph of the function 

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How can you decide without using a graphing tool? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b. The expression  can be written in equivalent factored from as  How can this fact be used to solve the equation  What do those solutions tell about the graph of *g(t)*?

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c. Use your answers from Part a and b to solve the inequality  Describe the solution using symbols and a number line graph.

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Graph:

d. Use similar reasoning to solve the inequality  and record the solutions using symbols and a number line graph.

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Graph:

2. Your answers to the questions in Problem 1 show how two key ideas reveal solutions to any quadratic inequality in the form $ax^{2}+bx+c\leq 0$ or $ax^{2}+bx+c\geq 0$.

a. How does sketching the graph of $f\left(x\right)=ax^{2}+bx+c$ help in solving a quadratic inequality in the form above? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b. How does solving the equation of $ax^{2}+bx+c=0$ help in solving a quadratic inequality like those shown? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. What are the possible number of x-intercepts for the graph of a quadratic function? Sketch graphs to illustrate each possibility.

i. ii. iii.

4. Combine algebraic and graphic reasoning to solve the following inequalities. For each inequality:



* Graph the left and right sides of the inequality separately.
* Use algebraic reasoning to locate the intersection points.
* Combine what you have learned from the sketch of the graph and the algebraic reasoning you used to find the intersection points to find the solution to the inequality.
* Record the solution using symbols.



 Sketch:

Intersection points: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Solve: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



 Sketch:

Intersection points: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Solve: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Sketch:

Intersection points: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Solve: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

d.  Sketch:

Intersection points: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Solve: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



e.  Sketch:

Intersection points: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Solve: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**APPLICATION**



What inequality would be represented by this situation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Graph the quadratic inequality:

Write the solution with symbols: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| Lesson Summary | In this investigation, you developed strategies for solving quadratic inequalities.1. How is solving quadratic inequalities similar to solving quadratic equations?
2. When solving a quadratic inequality, why is it helpful to graph the left and right sides of the inequality separately?
3. Describe the steps you take to solve an inequality in the form $ax^{2}+bx+c\leq d$.
4. Describe the steps you take to solve an inequality in the form $ax^{2}+bx+c\geq d$.
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HW #

1. Graph each quadratic inequality. Use algebraic reasoning to locate x-intercepts of the graph in order to solve the inequality. Record your solutions.



a.  Sketch:

Intersection points: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Solve: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b.  Sketch:

Intersection points: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Solve: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



c.  Sketch:

Intersection points: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Solve: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. The following graph shows how income and operating cost depend on ticket price and how they are related to each other. The relationship between income and operating cost  of a business are shown in the graph below.



a. Use the graph to estimate answers for the following questions, and explain how you arrive at each estimate.

 i. Write the inequality that represents when the operating cost will exceed income?

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 ii. Write the inequality that represents when the income will exceed operating cost?

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 iii. Write the inequality that represents when the income will equal operating cost?

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**REVIEW:**



3.

4.

8.