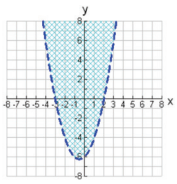
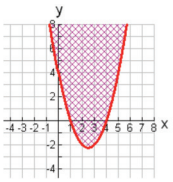
1st Quarter Grade 9 Supplemental Lesson Plan

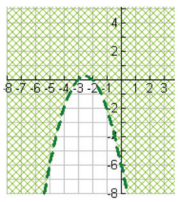
Quadratic Inequalities

Introduction:

Assess the students' prior knowledge on quadratic inequalities using the matching worksheet on http://www.regentsprep.org/Regents/math/algtrig/ATE6/QuadinequalMatch.htm.







A. $y > -x2 - 5x - 6$

B. $y > x2 + x - 6$

C. $y \leq 2x^2 - 3x - 2$

D. $y \geq x^2 - 5x + 4$

E. $y < -x^2 - x + 6$

Body:

1. Using a graphing utility, show to the class the graphs of the following quadratic functions:
   a. $x^2 - x - 12 > 0$
   b. $y \geq x^2 - 1$
   c. $x^2 - x - 12 < 0$
   d. $y \leq x^2 - 1$
2. To let the students come up with conjectures on quadratic inequalities, conduct a spin-off Think-Pair-Share activity (Lyman, 1981). Ask the students to think of what they have observed in the given graphs individually and then form pairs to discuss their thoughts and compare their answers. The pairs will share their answers to the whole class.

Knowledge

Quadratic Inequality

Learning Competencies

M9AL-If-1

- Illustrates quadratic inequalities

M9AL-If-2

- Solves problems involving quadratic inequalities

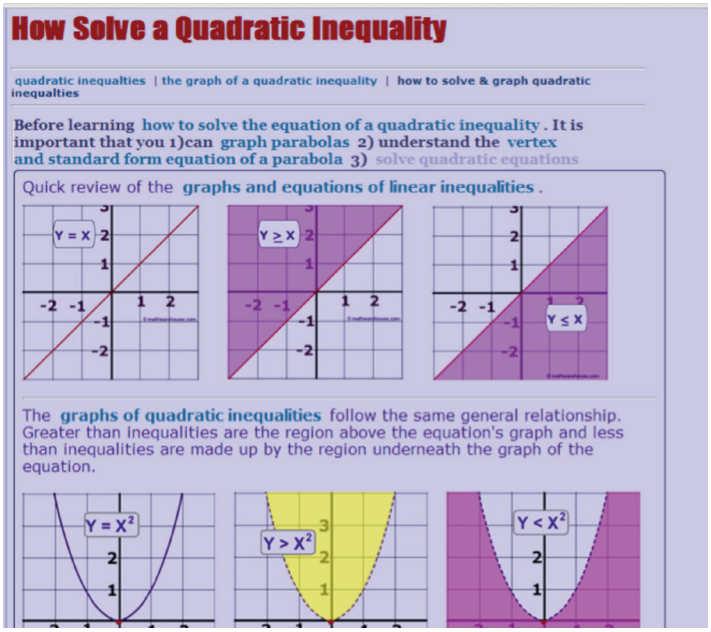
KU

- Quadratic inequalities can be used to model problems.

KQ

- How can quadratic inequalities be used to represent situations and solve problems?

3. Conduct a whole-class discussion on quadratic inequalities.
4. Show to the class how to solve quadratic inequalities algebraically and graphically. (http://www.mathwarehouse.com/quadratic-inequality/how-to-solve-and-graph-quadratic-inequality.php)



5. Give the students graphing exercises on quadratic inequalities in the form $y > mx + b$, and let them observe and form a conjecture on how to sketch the graph of this form easily.
6. Give the students more exercises.

Conclusion:

Ask the students to complete one or more sections of an Exit Sheet (Lujan, 2011).

I Understand	I Need Help
I learned... The lesson helped me...	I need help with... I have a question: _____
I Need Practice	**I Want More**
I am still confused about... I need to practice...	I could use this information... I wish I could...

Problem Solving Involving Quadratic inequalities

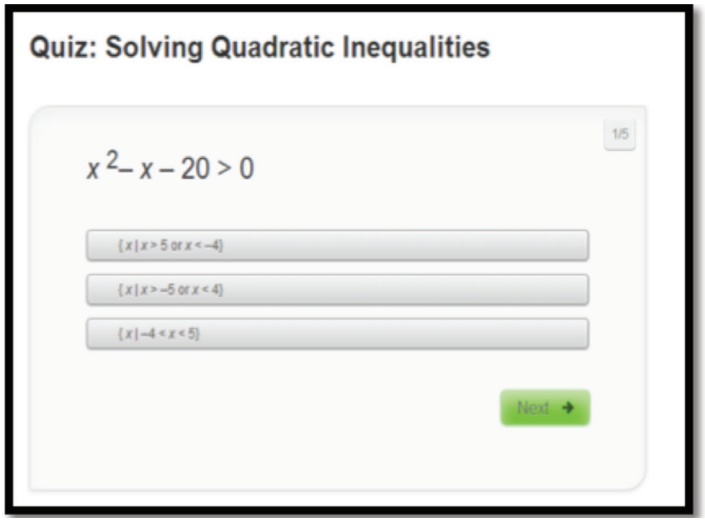
Introduction:

Elicit the students' prior knowledge using the KWLS Chart (Ogle, 1986).

Know	Want to Know	Learned	So What
Ask the students on what they know, or think they know about problem solving on quadratic inequalities.	Pose a question about quadratic inequalities.	As the lesson unfolds, the students will summarize the key things that they have learned.	As the lesson concludes, the students will consider the implications of their learnings. List the events in which the new knowledge will be useful to them inside and outside the school.

Body:

1. As a preliminary activity, ask the students to answer an online quiz on quadratic inequalities. (Sample site: http://www.cliffsnotes.com/math/algebra/algebra-ii/quadratics-in-one-variable/quiz-solving-quadratic-inequalities)



Knowledge

Problem Solving Involving Quadratic inequalities

Learning Competency

M9AL-If-g-1

- Solves problems involving quadratic inequalities

KU

- Quadratic inequalities can be used to model problems.

KQ

- How can quadratic inequalities be used to represent situations and solve problems?

2. Post the given challenge below:

   If a baseball is thrown at an initial speed of 15 m/s from a height of 2 m above the ground, the inequality $-49t^2 + 15t - 2 > 0$ models the time, t, in seconds that the baseball is in flight. During what time interval is the baseball in flight?

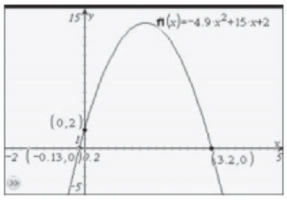
3. Conduct a spin-off Pairs Compare (Kagan, 1998) activity where students form pairs and answer the problem together in a specific time. When it is time, the pairs will pair up with another pair to answer the question and be able to share ideas.

4. Explain to the class how to solve the given challenge problem. (http://gabrielmathnorth.weebly.com/uploads/1/2/6/9/12696930/pre-calculus_11_-_chapter_9_website.pdf)

Solution

The baseball will be in flight from the time it is thrown until it lands on the ground.

Graph the corresponding quadratic function and determine the coordinates of the x-intercepts and the y-intercept.



Why is it useful to know the y-intercept of the graph in this case?

The graph of the function lies on or above the x-axis for values of x between approximately -0.13 and 3.2, inclusive. However, you cannot have a negative time that the baseball will be in the air.

The solution set to the problem is $\{t \mid 0 < t < 3.2, t \in R\}$. In other words, the baseball is in flight between 0 s and approximately 3.2 s after it is thrown.

5. For more practice, conduct a spin-off I Have the Question, Who Has the Answer (Rutherford, 2008) activity on problems involving quadratic inequalities.
   - Distribute answer cards to the students.
   - Place a question card on the desk of each student.
   - Designate a student to turn over a question card and say, "The question is... Who has the answer?"

- All the students will check their answer cards to see if they have the correct answer, and the process continues.

Conclusion:

For the summary of the lesson, ask the students to answer the "L" and "S" column of the KWLS Chart.