Introduction to the
Revised Mathematics TEKS

ALGEBRA I JOURNAL

TEA
Texas Education Agency

Revised Mathematics TEKS Scavenger Hunt

Review the Revised Mathematics TEKS for Algebra I, Algebra II, and Geometry. Use them to answer the following questions.

1. How many strands are in each content area? What are those strands?

   Algebra I _____   Geometry _____   Algebra II _____

2. Examine the knowledge and skills statement for each of your strands. How are these statements similar?

3. What is the significance of the mathematical process standards for each content area?

4. Choose one content area. I am examining _____.

5. For the content area you identified, choose one strand. I am examining _____.

6. What similarities do you find among the student expectations in the strand you identified?

7. Why might the student expectations have been grouped in this way?

Mathematical Process Standards 3-Word Summary

- Read the 7 process standards.
- Use 1, 2, or 3 words to summarize the main idea of each process standard.
- Record your answers in your journal.

Mathematical Process Standards The student uses mathematical processes to acquire and demonstrate mathematical understanding.	1–2–3 Word Summary
(1)(A) The student is expected to apply mathematics to problems arising in everyday life, society, and the workplace.	
(1)(B) The student is expected to use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.	
(1)(C) The student is expected to select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.	
(1)(D) The student is expected to communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.	
(1)(E) The student is expected to create and use representations to organize, record, and communicate mathematical ideas.	
(1)(F) The student is expected to analyze mathematical relationships to connect and communicate mathematical ideas.	
(1)(G) The student is expected to display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.	

Questions for Consideration

- What impact does the process standard have on the content student expectation?

- What impact does the process standard have on the way we expect students to respond to questions?

Content Area _____

Observations:

Reflection:
- What impact might integrating the mathematical process standards have on the way we expect students to demonstrate their understanding?

Algebra I and the Mathematical Process Standards (Algebra I)

Student Expectation

A(6)(A) The student is expected to determine the domain and range of quadratic functions and represent the domain and range using inequalities.

Determine the domain and range of the function shown below.
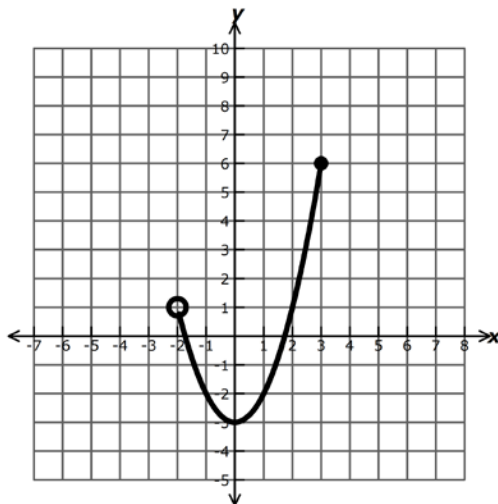
Integrating the Student Expectation with Mathematical Process Standards

A(6)(A) The student is expected to determine the domain and range of quadratic functions and represent the domain and range using inequalities.

A(1)(F) The student is expected to analyze mathematical relationships to connect and communicate mathematical ideas.

The functions $f(x)$ is shown below. Describe how the domain and range of $f(x)$ compares to that of $f(x-c)$. Describe how the domain and range of $g(x)$ compares to that of $g(x)+c$. Consider all possible cases.

Introduction to the Revised Mathematics TEKS: Grades 9-12
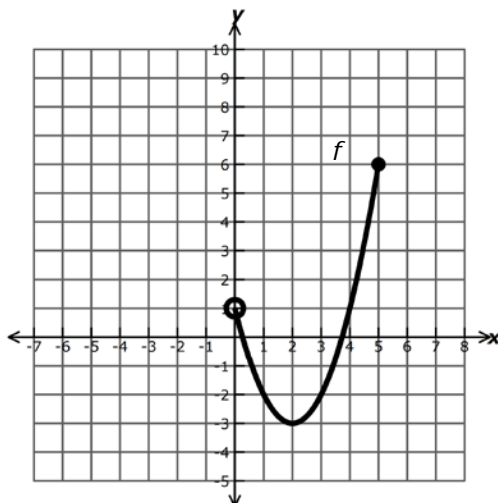
Amplifying an Instructional Task – Algebra I Example

Original Task

The student is expected to graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including x-intercept, y-intercept, zeros, maximum value, minimum values, vertex, and the equation of the axis of symmetry. A(7)(A)

Graph the function $f(x) = -x^2 + 30x - 104$, and identify the key attributes listed.
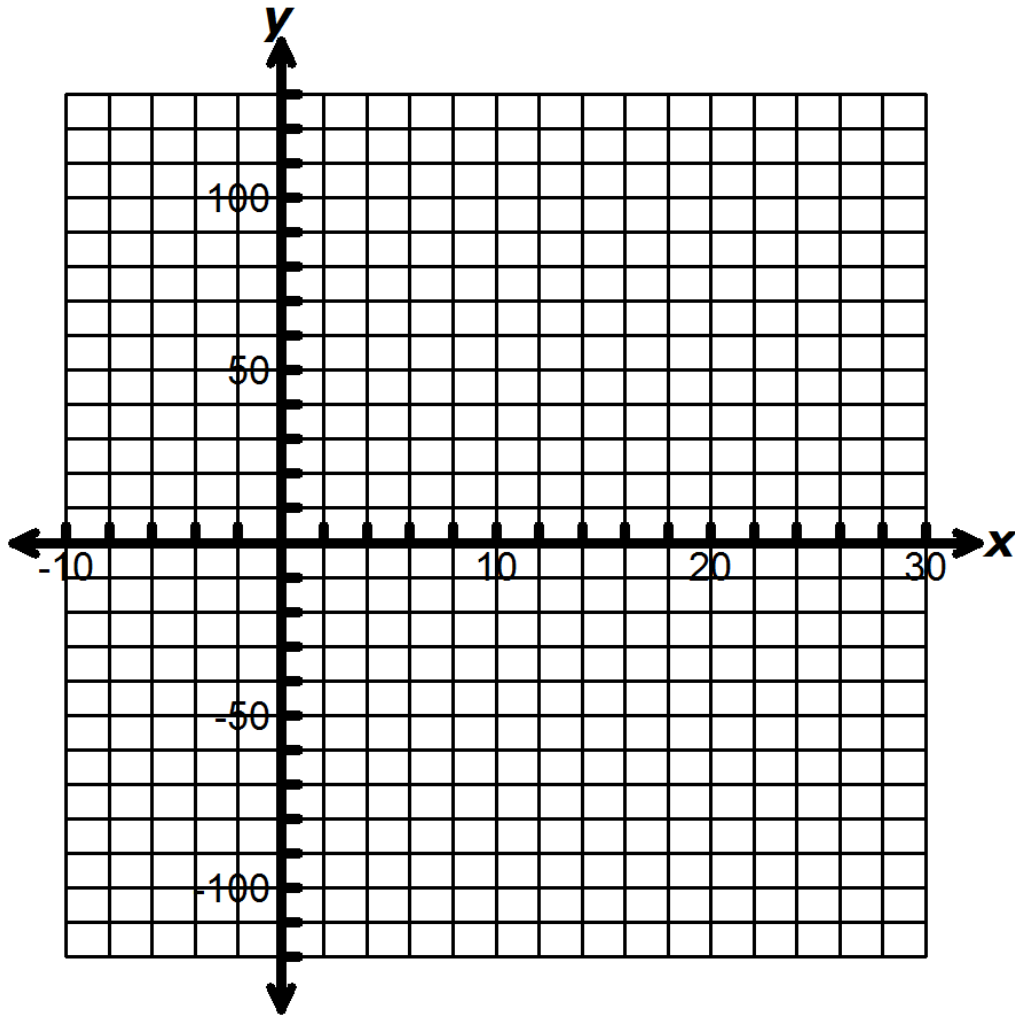
x-intercepts _____

y-intercept _____

zeros _____

maximum or minimum value _____

vertex _____

equation of the axis of symmetry _____

Amplifying Instructional Tasks – Algebra I Example

	Consider the revised TEKS in the Original Task	Considerations for Brainstorming		
		Consider the related SEs	Consider the Context	Consider the Student
Guiding Questions	What main concepts and/or skills are involved in this task? What are related concepts and/or skills?	What else might be explored or applied? • Additional mathematical ideas from related student expectations • Process standards • Grade level connections	**Real-World Context** What else could be explored within this context? What related ideas could be added? Is there a real-world context for this idea? **Mathematical context** Are there different starting points for the problem? How else could the material be presented?	What Tier I differentiation may be needed to reach the student who is • struggling, • learning English, and/or • advanced?
Brainstorming	**Main Concepts and/or Skills** *Identify key attributes of a quadratic function A(7)(A)* **Related Concepts and/or Skills** *Everyday life A(1)(A)*	**Process Standards** • *Process standards A(1)(A-G)* **Content Standards** • *Write quadratic functions using technology and make predictions A(8)(B)* • *Write quadratic functions given real solutions and graphs of related equations A(6)(C)* • *Write domain and range of quadratic functions using inequalities A(6)(A)*	**Context** • *How does the student thinking differ if the graph is presented first? Or the table?* • *What is the meaning of the points of a quadratic when placed in a context?* • *What are the reasonable domain values when given a context?*	**Struggling** • *Model the use of additional tools (hands-on, pictures).* • *Model the use of a table to look for a pattern.* **Learning English** • *Provide sentence stems and frames.* • *Provide opportunities to speak.* • *Pre-teach vocabulary.* **Advanced** • *Explore how parameter changes would affect the profit.*

Amplifying an Instructional Task – Algebra I Example

Amplified Task

Task A

Materials to make available:

• Graph paper

A community involvement team has decided to host a fundraiser for the local food bank. A singer has agreed to perform at the fundraiser at no charge. The auditorium charges a rate of $1040 which includes security, taxes and fees for all charity events.

The team will use the following information from similar events to determine the amount that they should charge for tickets.

Ticket Price, $	Profit, $
4	0
6	400
8	720
18	1120
22	720

Which ticket price will yield a profit for the event?

What would you recommend the committee charges per ticket to make the highest profit?

Task B (Scaffolded Task):
A community involvement team has decided to host a fundraiser for the local food bank. A singer has agreed to perform at the fundraiser at no charge. The auditorium charges a rate of $1040 which includes security, taxes and fees for all charity events.

The team will use the following information from similar events to determine the amount that they should charge for tickets.

Ticket Price, $	Profit, $
4	0
6	400
8	720
18	1120
22	720

1. The function to model the profit is quadratic. Use your knowledge of the symmetry of a quadratic function to find three additional points on the quadratic model.

2. Sketch the axis of symmetry for the graph.

3. Identify the following points and interpret the meaning of these points for the given situation:

     a. *x*-intercepts:_____ Meaning: _____

     b. axis of symmetry:_____ Meaning:_____

4. What would you recommend the committee charges per ticket to make the highest profit?
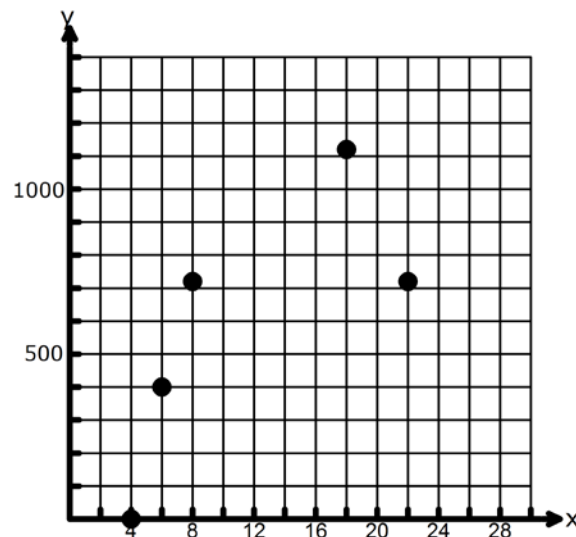
Task C (Scaffolded Task):

A community involvement team has decided to host a fundraiser for the local food bank. A singer has agreed to perform at the fundraiser at no charge. The auditorium charges a rate of $1040 which includes security, taxes and fees for all charity events.

The team will use the following information from similar events to determine the amount that they should charge for tickets.

Ticket Price, $	Profit, $
4	0
6	400
8	720
18	1120
22	720

What ticket price would yield the highest profit? Justify your response.

Consider using the following words in your justification:
    maximum   *minimum*   *profit*   *zero*   *x-intercept*   *vertex*

Task D (Enriched Task):

A community involvement team has decided to host a fundraiser for the local food bank. A singer has agreed to perform at the fundraiser at no charge. The auditorium charges a rate of $1040, which includes security, taxes and fees for all charity events.

The team will use the following information from similar events to determine the amount that they should charge for tickets.

Ticket Price, $	Profit, $
4	0
6	400
8	720
18	1120
22	720

What ticket price would yield the highest profit? Justify your response.

Write a function to model the profit when given the ticket price.

How would the following changes affect the profit and the equation that models the profit?

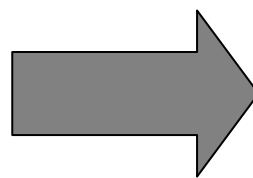- The manager of the auditorium decides to provide the auditorium at half price.

- The manager of the auditorium charges a rate of $1040, and the community involvement team decides to give 10% of the profits to the singer who performs at the fundraiser.

A Vertical Look at Key Concepts and Procedures

Taking a Closer Look at Slope

What does the document tell us?	What doesn't the document tell us?

A Vertical Look – Potential Perks and Pitfalls

Role	Perks	Potential Pitfalls
Teacher	• Helps teachers to stay in their lane • Helps buy back time by eliminating those ideas that do not belong in the current grade level • Helps to identify expected prerequisite knowledge and skills • Helps identify the key concepts and procedures within the strands • Helps to identify and anticipate gaps in students' prerequisite knowledge to better target interventions • Helps identify the length of time students have been working with a concept or procedure	• This is <u>NOT</u> a curriculum guide. • This does not provide the specificity that the TEKS provide. • This does not provide the relative importance of each key concept or procedure. • This does not tell how to teach the key concepts and procedures.
Evaluator	• Helps to clarify if the instruction is on grade level for classroom observations and documentation	
Curriculum Leader	• Helps guide conversations within and between grade levels • Helps facilitate movement and evaluation of curriculum materials • Helps target future professional development needs for the district	
Instructional Coach	• Helps guide conversations within and between grade levels • Helps facilitate movement and evaluation of curriculum materials • Helps target future professional development needs for each teacher	
Team Leader/ Department Chair	• Helps guide conversations within and between grade levels • Helps facilitate movement and evaluation of curriculum materials	
Parent	• Helps to clarify if the instruction is on grade level • Provides a concise look at what is to be covered in a grade level	

Side-by-Side Snap Shot Summary: Algebra I

	Current Strand	Content that REMAINS or is CLARIFIED	Content that is NEW	Content that is MOVED or DELETED
1	Foundations for Functions			
2	Linear Functions			
3	Quadratic and Other Nonlinear Functions			