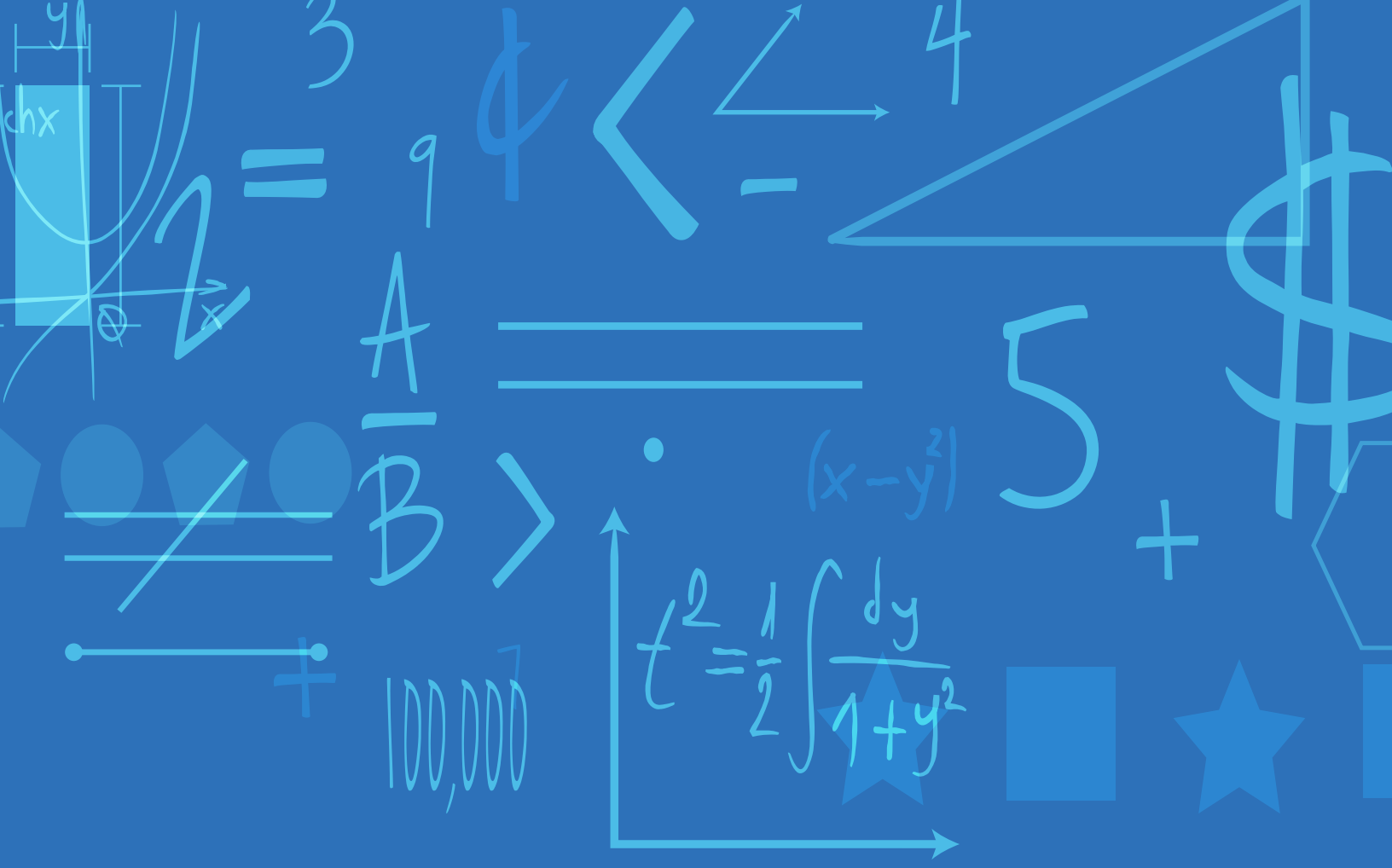


Introduction to the **Revised Mathematics TEKS**

GEOMETRY JOURNAL

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.	

Integrating Student Expectations with Mathematical Process Standards

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:

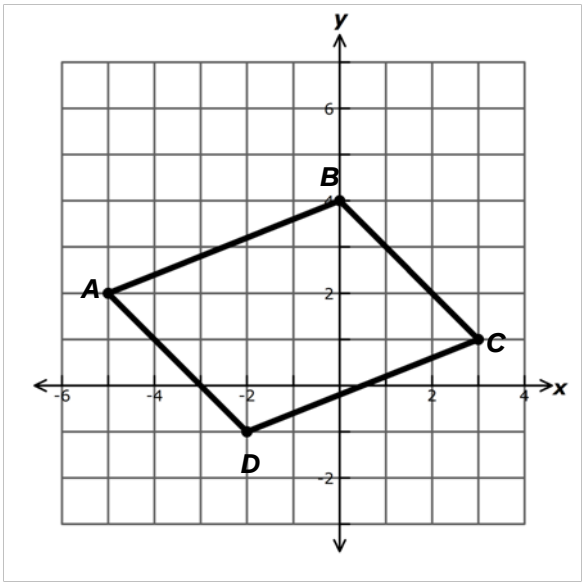
- What impact might integrating the mathematical process standards have on the way we expect students to demonstrate their understanding?

Geometry and the Mathematical Process Standards

Student Expectation

G(6)(E) The student is expected to prove a quadrilateral is a parallelogram, rectangle, square, or rhombus using opposite sides, opposite angles, or diagonals and apply these relationships to solve problems.

Prove that quadrilateral *ABCD* is a parallelogram.



Integrating the Student Expectation with a Mathematical Process Standard

G(6)(E) The student is expected to prove a quadrilateral is a parallelogram, rectangle, square, or rhombus using opposite sides, opposite angles, or diagonals and apply these relationships to solve problems.

G(1)(G) The student is expected to display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Equilateral triangles *QRX* and *RSY* are attached to the outside of regular pentagon *PQRST*. Is quadrilateral *QXYS* a parallelogram? Justify your answer using precise mathematical diagrams and language.

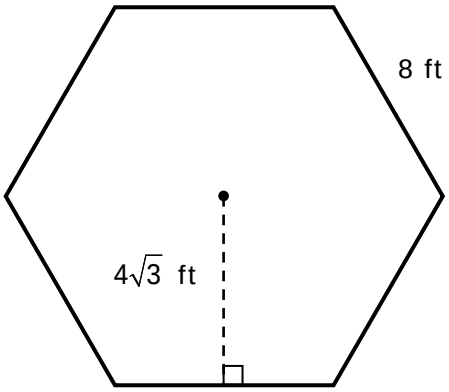
Describe your method of justification to a partner. Together determine what generalizations can be made, if any.

Amplifying an Instructional Task – Geometry Example

Original Task

The student is expected to apply the formula for the area of regular polygons to solve problems using appropriate units of measure. G(11)(A)

A theater company is designing a stage in the shape of a regular hexagon. The sides of the stage are 8 feet in length as shown in the diagram below. How many square feet of wood are needed to cover the stage?



Notes

Amplifying Instructional Tasks – Geometry 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** *Find area of regular polygons G(11)(A)* **Related Concepts and/or Skills** *Everyday life G(1)(A)*	**Process Standards** • *Process standards G(1)(A-G)* ***Content Standards*** • *Apply the relationships in special right triangles 30°-60°-90° and 45°-45°-90° and the Pythagorean theorem, including Pythagorean triples, to solve problems. G(9)(B)* • *Determine the area of composite two-dimensional figures comprised of a combination of triangles, parallelograms, trapezoids, kites, regular polygons, or sectors of circles to solve problems using appropriate units of measure. G(11)(B)*	**Context** • *How can area be used to determine dimensions?* • *How could triangle properties be used to find lengths needed to calculate area?* • *How do you determine amount of material needed for construction?*	**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 different pricing.* • *Explore how a change in amount of material affects the dimensions of the stage.*

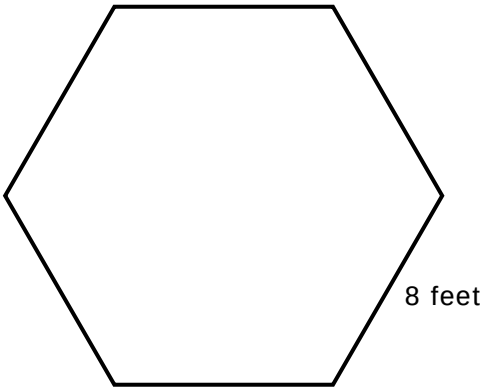
Amplifying an Instructional Task – Geometry Example

Amplified Task

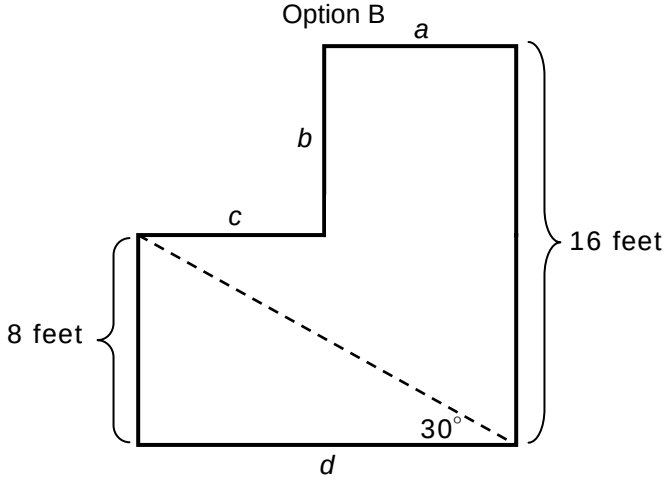
Task A

A theater company has purchased lumber to build a stage. They have two options for the shape of the stage. Option A is to create the stage in the shape of a regular hexagon with a side length of 8 feet as shown below. Option B is to create the stage in the shape of two adjacent rectangles. The same amount of lumber would be used to cover either option.

Option A



Option B



1. Determine the missing dimensions.

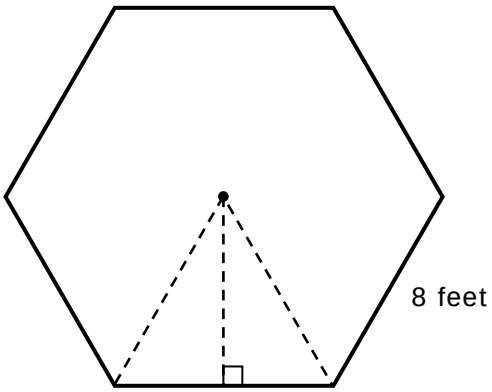
2. If the lumber is sold in boards that are 6 inches wide and 48 inches long, what is the minimum number of boards needed for Option A? Option B?

Notes

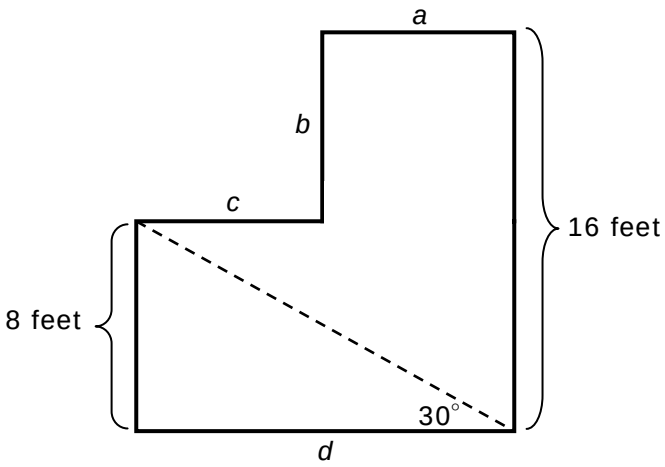
Task B (Scaffolded Task):

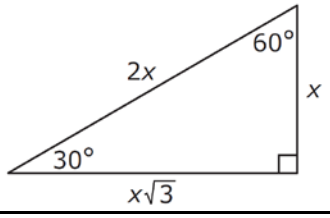
A theater company has purchased lumber to build a stage. They have two options for the shape of the stage. Option A is to create the stage in the shape of a regular hexagon with a side length of 8 feet as shown below. Option B is to create the stage in the shape of two adjacent rectangles. The same amount of lumber would be used to cover either option.

Option A



Option B



Area of a regular polygon:	Special Right Triangles:
$A = \frac{1}{2}aP$	30° – 60° – 90° triangle 

1. Determine the missing dimensions of the stages.

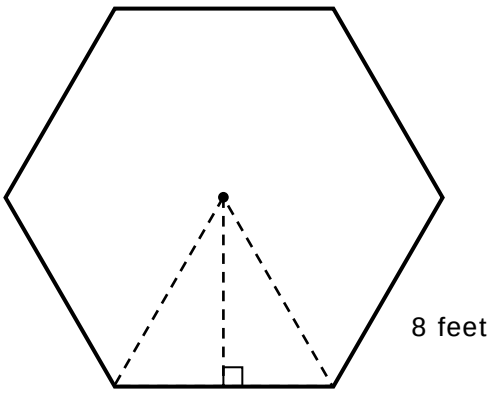
2. If the lumber is sold in boards that are 6 inches wide and 48 inches long, what is the minimum number of boards needed for Option A? Option B?

Notes

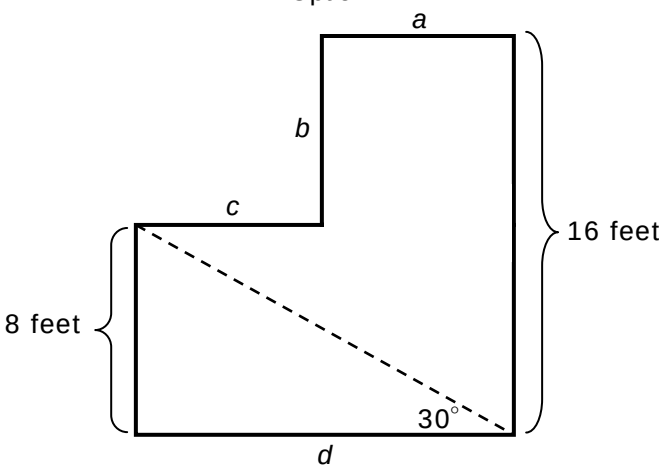
Task C (Scaffolded Task):

A theater company has purchased lumber to build a stage. They have two options for the shape of the stage. Option A is to create the stage in the shape of a regular hexagon with a side length of 8 feet as shown below. Option B is to create the stage in the shape of two adjacent rectangles. The same amount of lumber would be used to cover either option.

Option A



Option B



1. Determine the dimensions of both stages.

2. If the lumber is sold in boards that are 6 inches wide and 48 inches long, what is the minimum number of boards needed for Option A? Option B?

3. Describe the process you used to find the missing lengths for option B.

Consider using the following sentence starters in your justification:

I used special right triangles to find…

The sum of the two dimensions must equal…

If the area of the rectangle is…

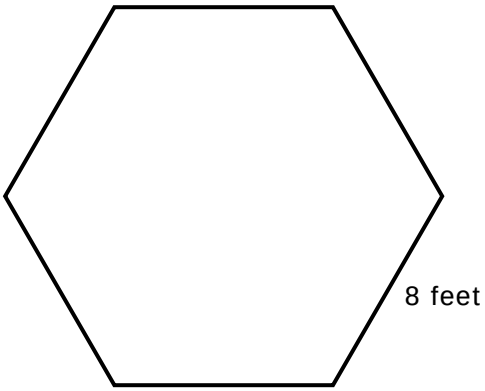
Given the area of _____, I _____ to find…

To find the area of the rectangle, I…

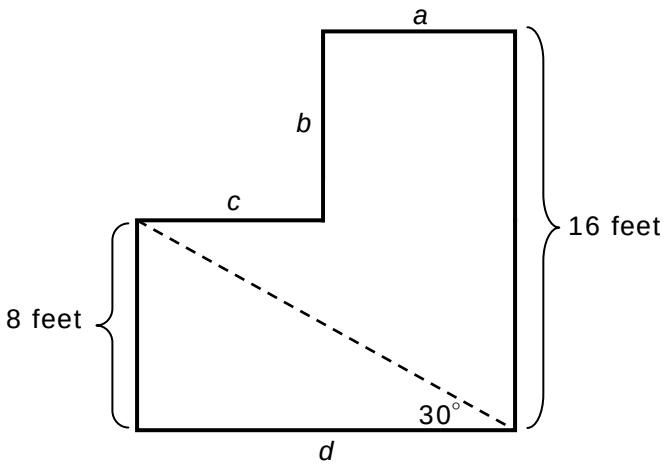
Task D (Enriched Task):

A theater company has purchased lumber to build a stage. They have two options for the shape of the stage. Option A is to create the stage in the shape of a regular hexagon with a side length of 8 feet as shown below. Option B is to create the stage in the shape of two adjacent rectangles. The same amount of lumber would be used to cover either option.

Option A



Option B



1. Determine the missing dimensions.

2. If the lumber is sold in boards that are 6 inches wide and 48 inches long, what is the minimum number of boards needed for Option A? Option B?

3. The cost for boards that are 6 inches wide and 48 inches long is $7.38 per board. The lumber company also sells boards that are 4 inches wide and 60 inches long for $6.75 per board. Which type of board would allow the theater company to build the least expensive stage?

4. The theater company found that they will be able to buy twice as much lumber as they first thought. What would be the side lengths of both stages if they use twice as much lumber to build the stages as shapes similar to the original stages?

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: Geometry

	Current Strand	Content that REMAINS or is CLARIFIED	Content that is NEW	Content that is MOVED or DELETED
1	Geometric Structure			
2	Geometric Patterns			
3	Dimensionality and the Geometry of Location			
4	Congruence and the Geometry of Size			
5	Similarity and the Geometry of Shape			

