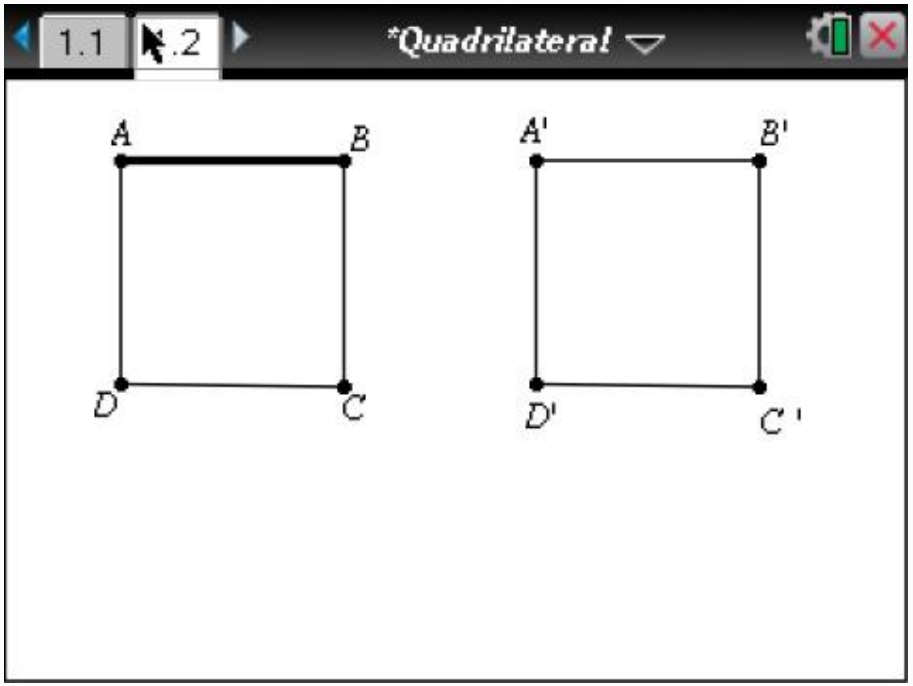
Reflecting on Practice: Worthwhile Tasks

Session 1

What makes a worthwhile task?

What do you (*as students*) predict will happen to the area if you "slant" the quadrilateral? Why?



Bringing it all together

A sixth grade class studying area of polygons in the fall

As you watch the video, consider :

- What about the nature of the task promoted or inhibited discussion?

Video

By yourself, write down what you noticed about the slanted quadrilateral task that promoted or inhibited discussion.

Exponents

The teacher's goal was that students should know and be able to apply the laws of exponents. The video of this task being implemented is from the TIMSS 1999 video study and takes place in an eighth grade algebra classroom in the US. The tasks in which students are engaged are on the worksheet.

Exponents

An eighth grade class beginning the study of the exponent rules

As you watch the video, consider :

- What about the nature of the task promoted or inhibited discussion?

Exponents

SECTION 1

1. $a^2 \bullet a^4 =$

2. $a^2 \bullet a =$

RULE: $a^m \bullet a^n =$

SECTION 2

4. $(a^2)^{3-}$

5. $(a^3)^2 =$

RULE: $(a^m)^n =$

SECTION 3

7. $(a \bullet b)^3 =$

8. $(a \bullet b)^5 =$

Video

http://www.timssvideo.com/us3-exponents#tabs-1

By yourself, write down what you noticed about the nature of the exponent task that promoted or inhibited discussion.

At your tables, go around the table round robin with each person offering a thought about difference in the nature of the *two* tasks with respect to how they promoted or inhibited discussion.

Choose one person at your table to record the ideas as you go.

At your tables, go around the table round robin with each person offering a thought about difference in the nature of the *two* tasks with respect to how they promoted or inhibited discussion.

- What was the big idea from your table?

Tasks have to be justified in terms of the learning aims they serve and can work well only if opportunities for pupils to communicate their evolving understanding are built into the planning.

(Black & Wiliam, 1998)

Mathematics Teaching Practices: Effective teachers

1. Establish mathematics goals to focus learning.
2. Implement tasks that promote reasoning and problem solving.
3. Use and connect mathematical representations.
4. **Facilitate meaningful mathematical discourse.**
5. Pose purposeful questions.
6. Build procedural fluency from conceptual understanding.
7. Support productive struggle in learning math.
8. Elicit and use evidence of student thinking.

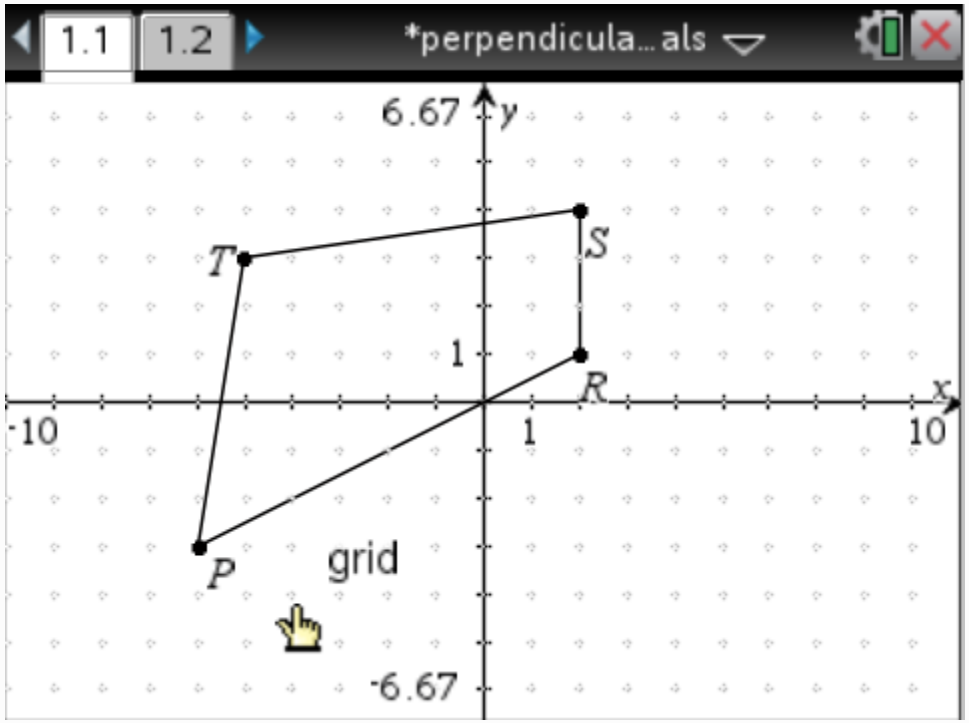
(NCTM, 2014)

What do we mean when we say a "meaningful mathematical discourse"?

What does it look like?

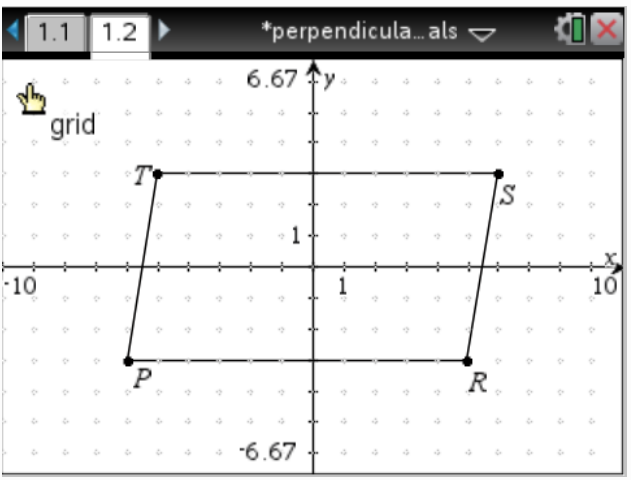
A Quadrilateral

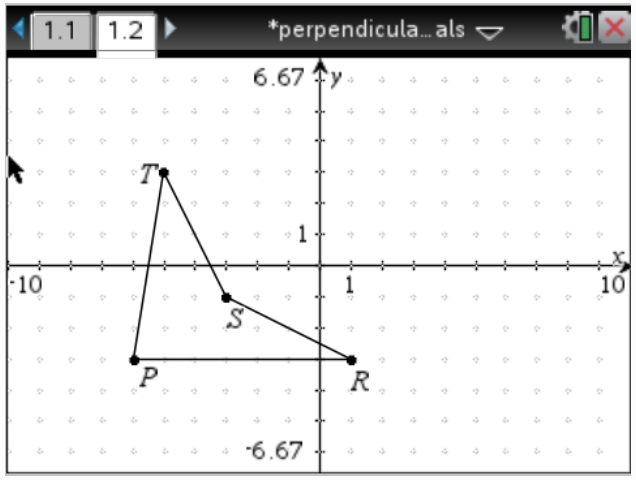
- Move vertices R and S to create a quadrilateral whose diagonals are perpendicular to each other.

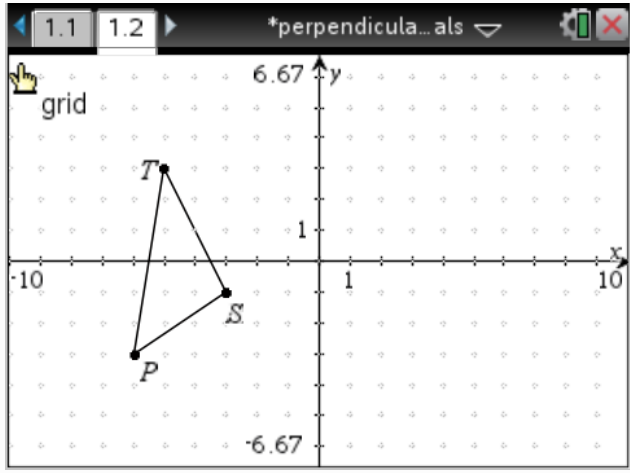


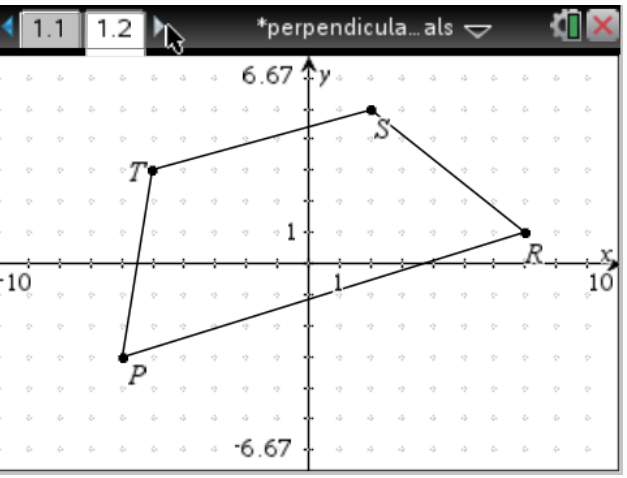
Student work

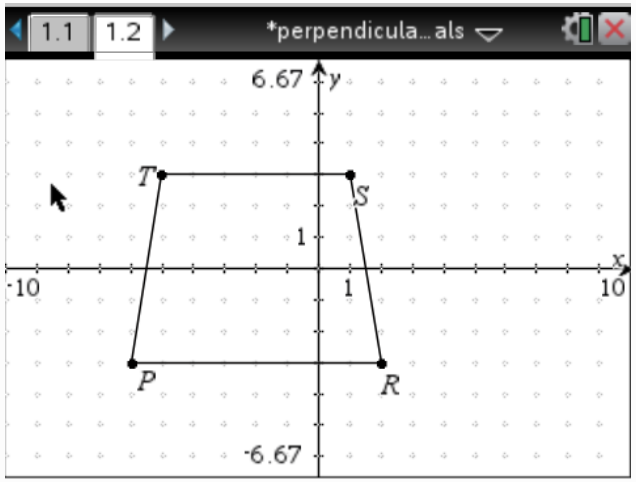
With your table, discuss what possible student solutions might look like. What sort of discussions would you expect students to engage in and what mathematical ideas would you expect to emerge?

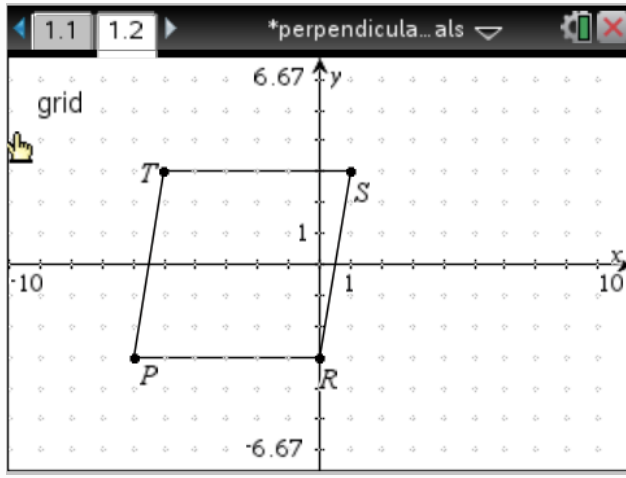

1.1
1.2
*perpendicula... als
grid
6.67
y
T
S
1
x
-10
1
10
P
R
-6.67

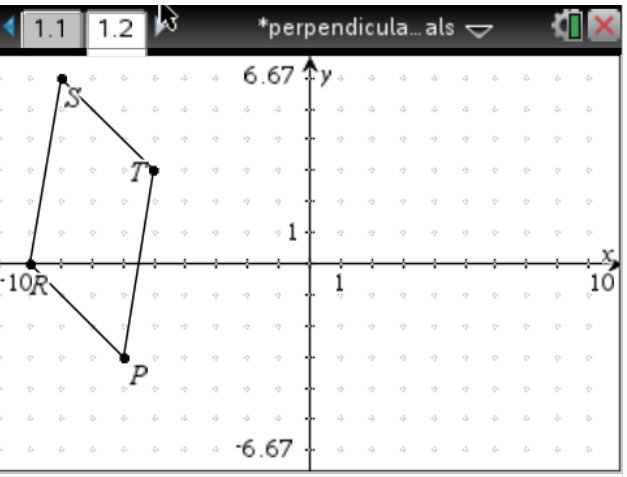

1.1
1.2
*perpendicula... als
6.67
y
T
1
x
-10
1
10
S
P
R
-6.67

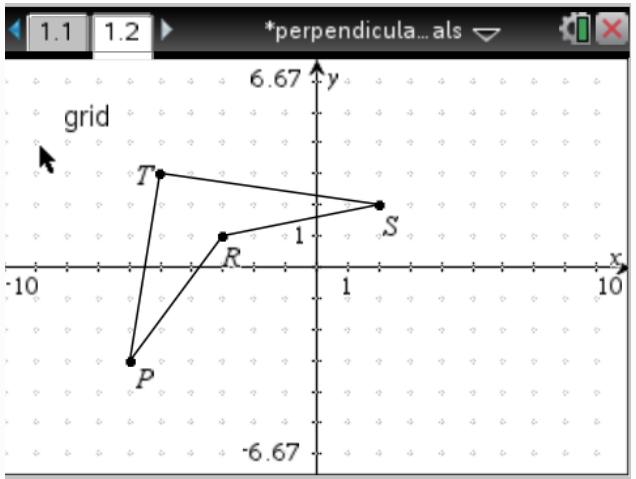

1.1
1.2
*perpendicula... als
grid
6.67
y
T
1
x
-10
1
10
S
P
-6.67

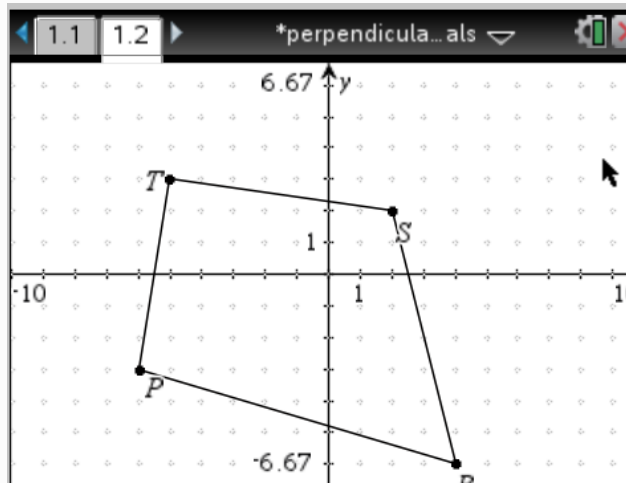

1.1
1.2
*perpendicula... als
6.67
y
S
T
1
x
-10
1
10
R
P
-6.67


1.1
1.2
*perpendicula... als
6.67
y
T
S
1
x
-10
1
10
P
R
-6.67


1.1
1.2
*perpendicula... als
grid
6.67
y
T
S
1
x
-10
1
10
P
R
-6.67


1.1
1.2
*perpendicula... als
6.67
y
S
T
1
x
-10
R
1
10
P
-6.67


1.1
1.2
*perpendicula... als
grid
6.67
y
T
S
1
R
x
-10
1
10
P
-6.67


1.1
1.2
*perpendicula... als
6.67
y
T
S
1
x
-10
1
P
-6.67

Quadrilateral Task

What about the nature of this task promoted or inhibited student discussion?

Discussions are important because they surface student thinking, which should inform our next steps as teachers – not to "set them straight" but to work together to negotiate mathematical understanding.

We've identified some characteristics of tasks that engage students in productive discussions.

Reference

- Black, P. & Wiliam, D. (1998). "Inside the Black Box: Raising Standards Through Classroom Assessment". *Phi Delta Kappan*. Oct. pp. 139-148.
- Bringing It All Together (2012). Video clip from T-Cubed Common Core State Standards Professional Development Workshop. Brennan, B., Olson J. & the Janus Group. Curriculum Research & Development Group. University of Hawaii at Manoa, Honolulu HI (2009).
- Cirillo, M. (2013). *What Are Some Strategies for Facilitating Productive Classroom Discussions?* NCTM Research Brief. S, DeLeeuw, Series Editor, Reston VA: National Council of Teachers of Mathematics. https://www.nctm.org/Research-and-Advocacy/Research-Brief-and-Clips/Strategies-for-Discussion/