TI-*nspire*™

Grade level: 7-10
Subject: mathematics
Time required: 60 minutes

Exploring Parallel Lines and Angles

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Activity overview

Students will explore the relationships between pairs of angles formed when two parallel lines are cut by a transversal. They will identify special pairs of angles, measure all the angles formed by two parallel lines cut by a transversal, and then look for patterns among the measures.

Concepts

Parallel lines
Angles
Measurement

Teacher preparation

Load the parallellinesandangless.tns file onto all student calculators.
The Parallel Lines and Angles.doc is a handout for the students to follow along as they work through this activity. The parallellinesandanglest.tns file is for the teacher to be able to view the results the students should obtain as they work through this activity. A worksheet key, Parallel Lines and Angles key.doc, is also provided for teacher use.

Classroom management tips

The instructor should direct students to open the parallellinesandangless.tns file. Once students have opened the file, the teacher should monitor the students, assisting them as they work through the steps in this activity. This activity may work well with students arranged in pairs. Students may need initial help with measuring angles. A worksheet has been provided for completion by the students.

TI-Nspire Applications

Graphs & Geometry,Notes

Step-by-step directions

This activity was designed to guide students through the discovery of relationships among the pairs of angles formed by two parallel lines cut by a transversal. Students should already be familiar with the following terms through definition and diagram but no reference to angle measurements of these special pairs is expected:

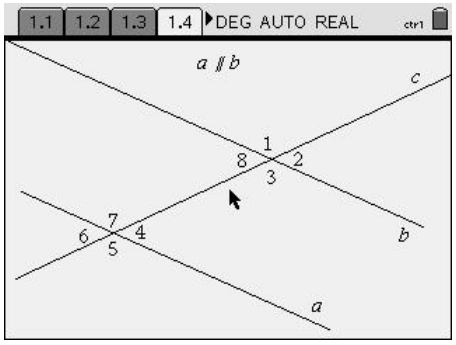
Parallel lines
Transversal
Corresponding Angles
Alternate Interior Angles
Alternate Exterior Angles
Consecutive (same side) Interior Angles
Consecutive (same side) Exterior Angles
Congruent
Supplementary

Students should be familiar with how to measure angles on the TI-Nspire as this activity requires great use of this skill.

The activity itself is quite self-explanatory and works well with even younger, inexperienced TI-Nspire users. The teacher file and worksheet key provide a guide to expected responses.

Problem 1

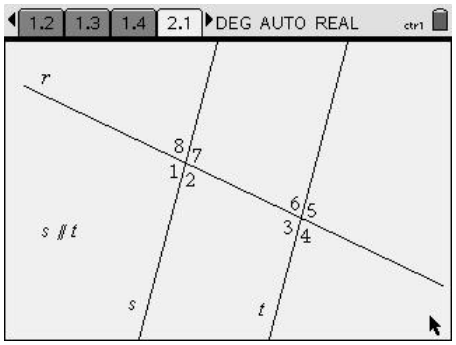
Students are asked to look at the diagram on page 1.4 and simply identify the special pairs of angles by number. For example, <1 and <7 are corresponding angles.



Once students have identified all the angle pairs on parts a through e on their worksheet, they are asked to measure all eight angles on their handheld. Students are to record the measurements on their worksheet on the copy of the diagram provided.

Problem 2

Students are to complete Problem 2 using the diagram on page 2.1, following the same steps as with Problem 1. At this point, students should be looking at both problems, and hopefully observing some patterns in the measurements found.

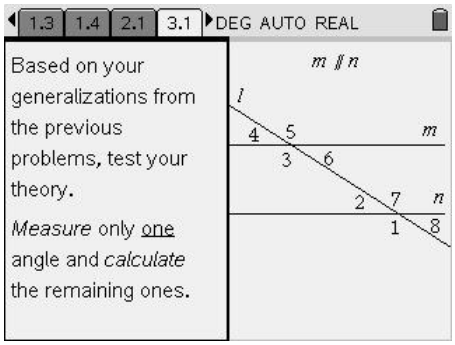


Students may wish to insert a calculator page if necessary for help with computation as they explore the angle measurements before stating their generalizations.

Problem 3

This problem is provided for students to test their conjectures formed by observing results from Problems 1 and 2. As stated, students should only be using the measurement tool to measure one angle. They are to calculate the remaining seven measures based on their observations. Only after completing all eight measurements should they verify their results by measuring on their handhelds.

If any calculated measurements are incorrect, they should refer back to their conjectures formed on their documents and make corrections.

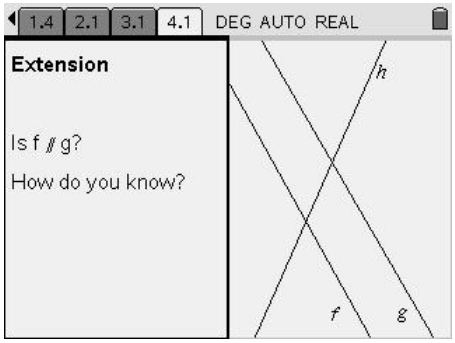


Assessment and evaluation

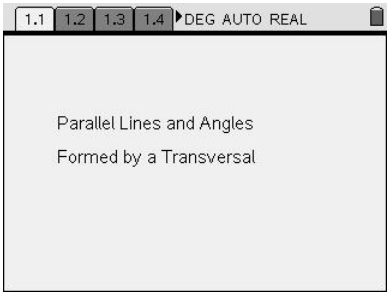
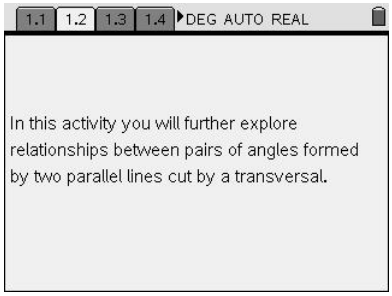
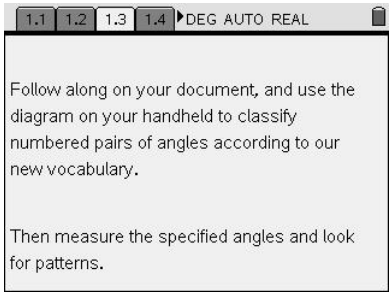
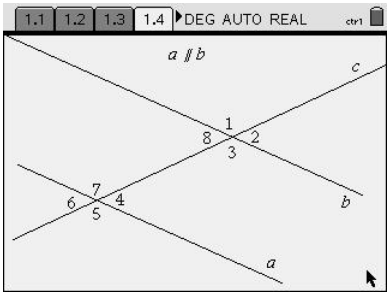
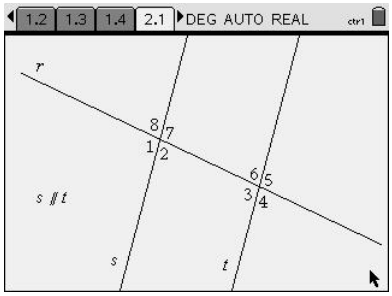
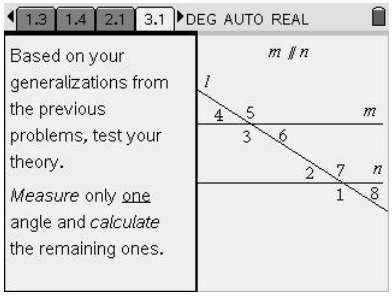
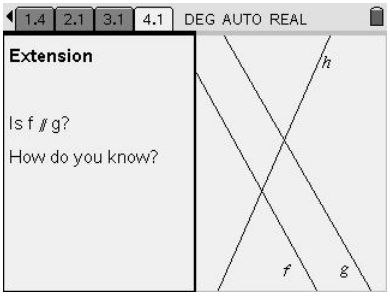
Problem 4

As students finalize their theories about these special angles formed by two parallel lines cut by a transversal, this problem poses the question of whether two given lines are parallel. A prior study of logic may lead students to realize that they are being asked if the converse is true. By now they have observed and tested that if two parallel lines are cut by a transversal, then for example, corresponding angles are congruent. In this diagram, they may decide to measure any of these special pairs of angles to determine if the lines are indeed parallel.

(Ex. Since a pair of corresponding angles measured are not congruent, the lines are not parallel.)



Note: While it was not the intended method, students may find that they can measure the slopes of lines f and g and determine that the lines are not parallel because their slopes are not equal.

- *Collect the student documents and assess them for understanding. While Problem 4 should give good insight into their level of understanding, it may be necessary to follow up with a similar activity, providing additional examples with which to make comparisons.*

Student TI-Nspire Document
parallellinesandangless.tns