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Following Directions on a Map: Parallel Lines Cut by a Transversal **Math 8**

Take a look at these maps. One is a map of Lower Manhattan, and the other is a map of Boston. Which one has more parallel streets?

It is a lot easier to give directions or find your way when the streets are parallel, although sometimes the street corners may start to look the same. But you know what? If the streets are parallel then sometimes the street corners are the same angle! Because of the angle pairs created when parallel lines are cut by a transversal.

Today you will be creating a simple map of a small town. The town is made up of 3 parallel streets and it has the Transverse Trolley line cutting down through all three streets.
Find the blank map on p. 2 to help you create your map as well as navigate through town.

Use your ruler and describe how you know the lines are parallel on the map on page 2.

What is a Transversal? Explain in your own words. (Look at the Transverse Trolley line on the map on page 2).

Is the Transverse Trolley line perpendicular to the streets? Why or why not?

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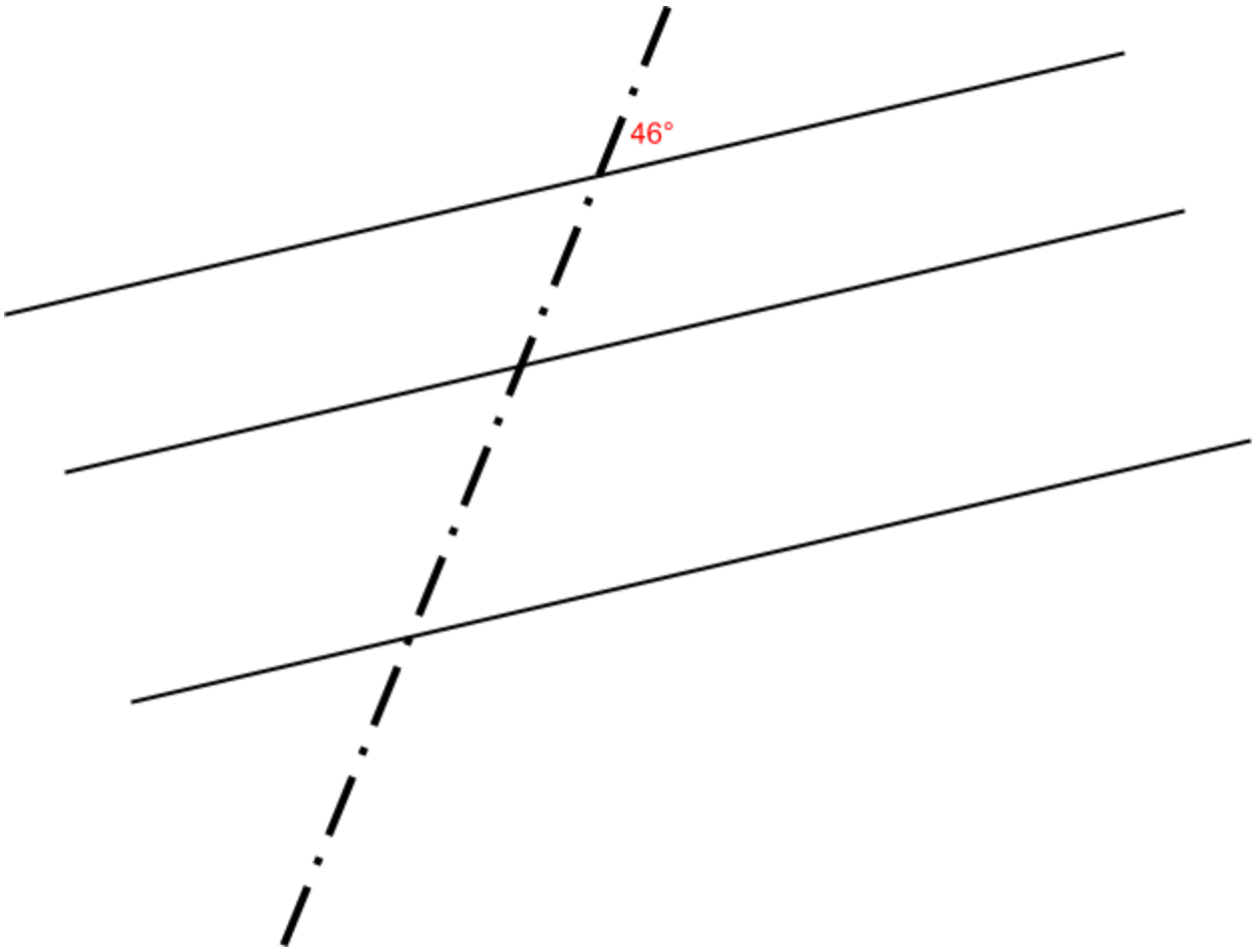
MAP of TRANSVERSE PARALLEL-VILLE (Note to designer, make a blank map similar to this. Make it full page size. Make the smaller angle as close to 46° as possible. Label only this angle 46°)



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How to fill out your map

Work with your partner and use the angle pair sheets to make sure you are labeling the correct locations.

On the map, label the streets on the left side of the map and label the transversal along the line:

- North Apple Street
- Center Street
- South Sunset Street
- Transverse Trolley Line

Sketch an icon of your HOUSE at the angle marked 46°

Make your angle tool:

1. Take a sticky note, line the bottom edge up along North Apple Street.
2. Look through the paper and trace the Trolley Line.
3. Take the sticky note off and cut along this line. You should now have 2 angles to use to help find congruent angles throughout the activity.
4. Write 46° on the smaller angle.
5. Use this to find the other angles that match and also have an angle 46°, Mark the angle measures on your map.

What is the measure of the other part of your angle tool, the supplementary angle? _____

Locations:

Using the angle pair reference sheets, work with your partner to sketch icons for each landmark.

1. **Post Office:** Place at the farthest alternate exterior angle from your house.
2. **Bank:** Place at a vertical angle from the post office.
3. **Supermarket:** Place at a corresponding angle to your House.
4. **Park:** Place at an alternate interior angle to the Supermarket.
5. **School:** Place at an alternate interior angle to the Bank.
6. **Police Station:** Place at a supplementary angle to the School.
7. **Firehouse:** Place at a consecutive interior angle to the School.
8. Check to see that the Firehouse and the Police Station are at alternate interior angles.

Before creating your own Navigation Prompts between the following landmarks, be sure to check you have everything in the right spot. Ask your teacher to review it or to give you a copy of the ANSWER KEY to check it yourself.

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Navigate and record directions for the following scenarios:

1. Your mother is picking you up at school. She leaves your house, goes to the bank, and then to the supermarket, before she picks you up at school and then takes you to the park. Provide directions for this journey by using angle pair terms. You may only say the name of the starting location, House, and then you must provide angle terms to get them to the next landmark. Once the journey is complete, the partner must tell you where he/she ended up. Did your partner make it to the correct destination? Record where your partner ended up and check the journey's path. Record the instructions below and your partner will trace the path on his/her map in BLUE.

Where was the planned destination? _____
Where did your partner end up?_____

2. A police officer had to patrol the neighborhood. First stop was the school, then the bank and post office, then the finally the firehouse. Provide angle pair terms to help your partner navigate on the patrol. List the directions below as your partner traces the path in RED.

Where was the destination? _____
Where did your partner end up?_____

3. Create your own navigation directions. You can list names of places and the appropriate angle pair terms to help give directions as your partner traces the path in GREEN pencil. After you trace your partner's path, you must record the navigation steps by following the GREEN path that you drew.

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Reflection Questions

1. Are vertical angles congruent?

2. Can you find 2 sets of vertical angles where all 4 angles are congruent? Describe and circle on your map.

3. Which two types of angle pairs are not always congruent?

4. Did you prefer following directions in order to navigate through the map of town or giving directions? Why?

5. Which angle pairs were the hardest for you to remember?

6. What do the 4 angles add up to at any given intersection?

7. Can you have alternate interior angles between South Sunset Street and North Apple Street? Explain.

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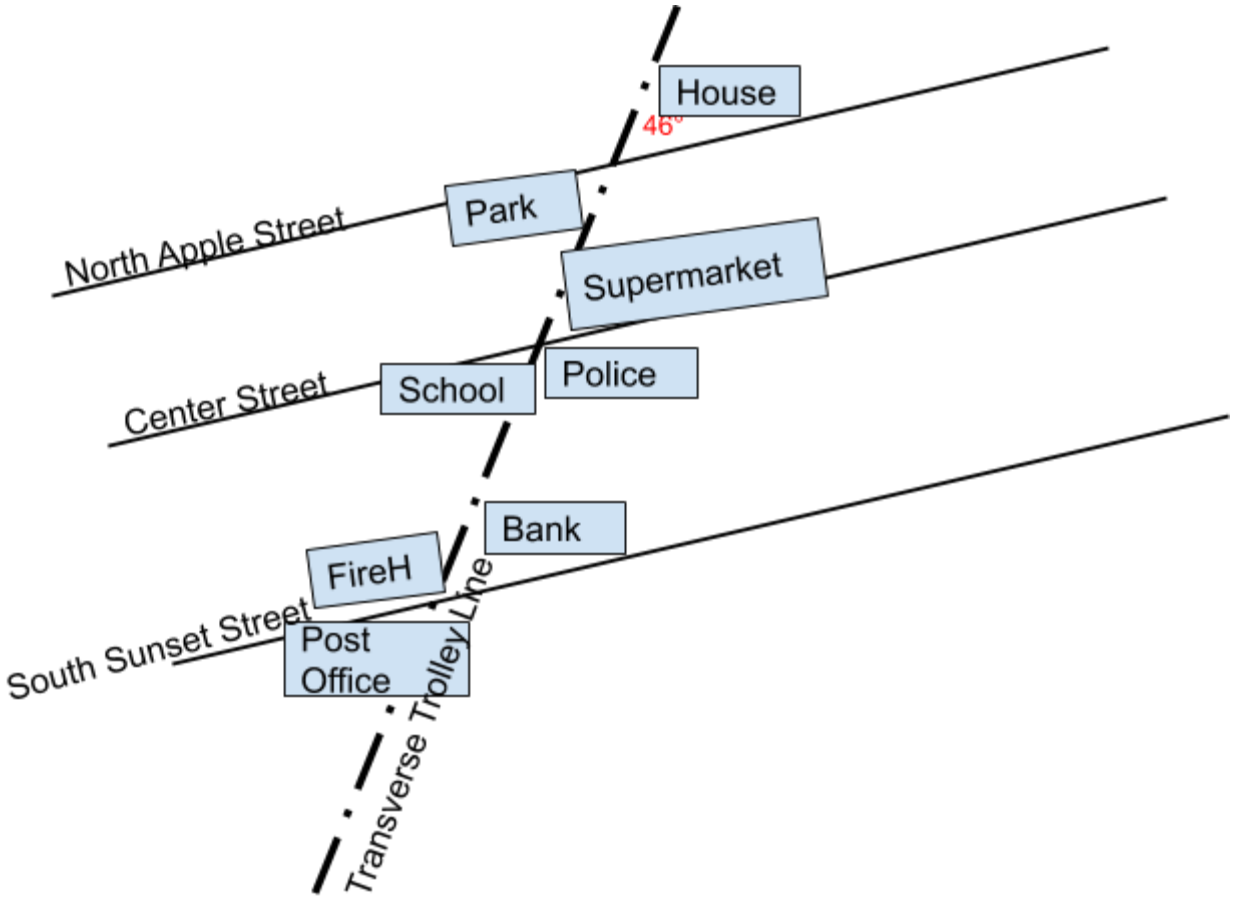
Answer Key (For the TEACHER or to check landmark placement)



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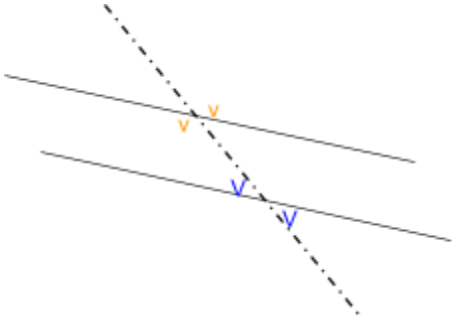
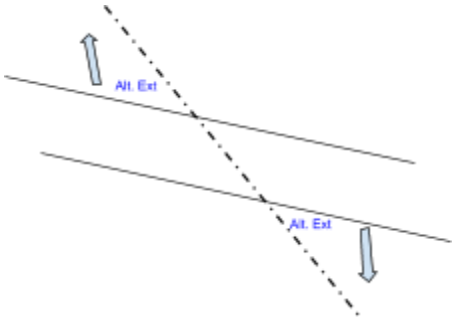
Angle Pair Examples/ Reference Sheet **Note to designer - create either a page showing all examples for the students to use as reference, or create full page pictures for the teachers to hang up or share one at a time.**

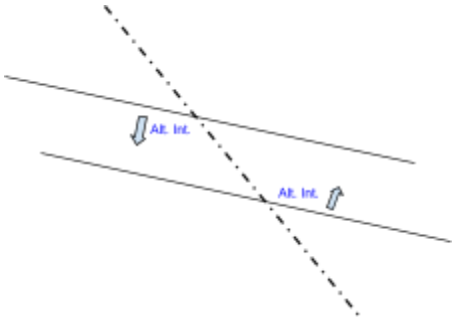
Examples below:



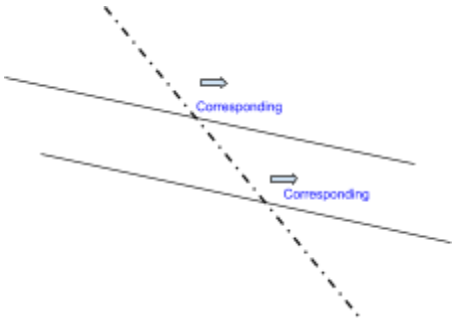
examples of vertical angles



Example of alternate exterior



Example of alternate interior



Corresponding - same side of transversal

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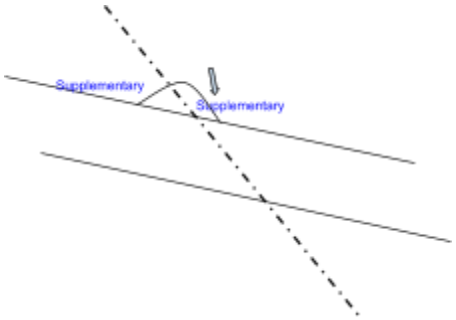
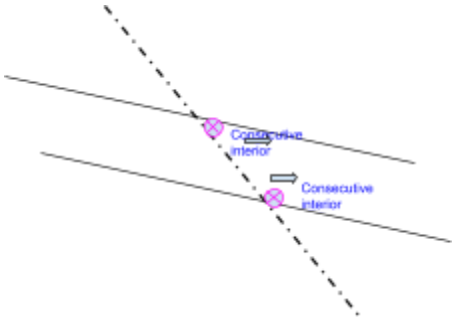


Supplementary along a 180 line. (not congruent. 180-x and x)



Consecutive interior angles - not congruent