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Standards Correlations

The standards correlations below support the implementation of the Common Core Standards. This book includes station activity sets for the Common Core clusters of Congruence; Similarity, Right Triangles, and Trigonometry; Circles; and Expressing Geometric Properties with Equations. This table provides a listing of the available station activities organized by Common Core standard.

The left column lists the standard codes. The first letter of the code represents the Common Core domain. The domain letter is followed by a dash and the initials of the cluster name, which is then followed by the standard number. The middle column lists the title of the station activity set that corresponds to the standard, and the right column lists the page number where the station activity set can be found.

The table indicates the standards that are heavily addressed in the station sets. If there are other standards that are addressed within the set, they can be found on the first page of each set.

Standard	Set title	Page number
G-CO.2.	Corresponding Parts, Transformations, and Proof	28
G-CO.3.	Translations, Dilations, Tessellations, and Symmetry	77
G-CO.3.	Coordinate Proof	90
G-CO.4.	Translations, Dilations, Tessellations, and Symmetry	77
G-CO.5.	Corresponding Parts, Transformations, and Proof	28
G-CO.5.	Translations, Dilations, Tessellations, and Symmetry	77
G-CO.5.	Coordinate Proof	90
G-CO.6.	Corresponding Parts, Transformations, and Proof	28
G-CO.6.	Translations, Dilations, Tessellations, and Symmetry	77
G-CO.6.	Coordinate Proof	90
G-CO.7.	Corresponding Parts, Transformations, and Proof	28
G-CO.7.	Special Congruent Triangles	40
G-CO.8.	Corresponding Parts, Transformations, and Proof	28
G-CO.9.	Parallel Lines and Transversals	1
G-CO.10.	Classifying Triangles and Angle Theorems	13
G-CO.10.	Bisectors, Medians, and Altitudes	50
G-CO.10.	Triangle Inequalities	65
G-CO.10.	Ratio Segments	126
G-CO.11.	Rhombi, Squares, Kites, and Trapezoids	101

(continued)

Standards Correlations

Standard	Set title	Page number
G-C0.12.	Bisectors, Medians, and Altitudes	50
G-C0.12.	Rhombi, Squares, Kites, and Trapezoids	101
G-C0.12.	Ratio Segments	126
G-C0.12.	Circumcenter, Incenter, Orthocenter, and Centroid	177
G-C0.12.	Perpendicular Lines	205
G-CO.13.	Circumcenter, Incenter, Orthocenter, and Centroid	177
G-SRT.1.	Translations, Dilations, Tessellations, and Symmetry	77
G-SRT.1.	Coordinate Proof	90
G-SRT.2.	Translations, Dilations, Tessellations, and Symmetry	77
G-SRT.2.	Similarity and Scale Factor	112
G-SRT.4.	Ratio Segments	126
G-SRT.5.	Similarity and Scale Factor	112
G-SRT.5.	Ratio Segments	126
G-SRT.6.	Sine, Cosine, and Tangent Ratios, and Angles of Elevation and Depression	139
G-SRT.7.	Sine, Cosine, and Tangent Ratios, and Angles of Elevation and Depression	139
G-SRT.8.	Special Congruent Triangles	40
G-SRT.8.	Sine, Cosine, and Tangent Ratios, and Angles of Elevation and Depression	139
G-C.2.	Circumference, Angles, Arcs, Chords, and Inscribed Angles	151
G-C.2.	Special Segments, Angle Measurements, and Equations of Circles	165
G-C.3.	Circumcenter, Incenter, Orthocenter, and Centroid	177
G-C.4.	Special Segments, Angle Measurements, and Equations of Circles	165
G-C.5.	Circumference, Angles, Arcs, Chords, and Inscribed Angles	151
G-C.5.	Special Segments, Angle Measurements, and Equations of Circles	165
G-GPE.1.	Special Segments, Angle Measurements, and Equations of Circles	165
G-GPE.4.	Corresponding Parts, Transformations, and Proof	28
G-GPE.4.	Special Congruent Triangles	40
G-GPE.4.	Similarity and Scale Factor	112
G-GPE.4.	Coordinate Proof with Quadrilaterals	219
G-GPE.5.	Parallel Lines, Slopes, and Equations	192
G-GPE.5.	Perpendicular Lines	205
G-GPE.7.	Similarity and Scale Factor	112

Congruence

Set 1: Parallel Lines and Transversals

Instruction

Goal: To provide opportunities for students to develop concepts and skills related to identify and use the relationships between special pairs of angles formed by parallel lines and transversals

Common Core Standards

Congruence

Experiment with transformations in the plane.

- G-CO.1.** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

Prove geometric theorems.

- G-CO.9.** Prove theorems about lines and angles.

Student Activities Overview and Answer Key

Station 1

Students will be given graph paper, a ruler, and a protractor. Students will use the graph paper and ruler to model parallel lines cut by a transversal. They will use the protractor to find vertical angles. Then they will use the graph paper to model lines, which are not parallel, that are cut by a transversal. They will use the protractor to find vertical angles. They will realize that vertical angles can be found by both parallel and non-parallel lines cut by a transversal.

Answers

1. Answers will vary.
2. $\angle A \cong \angle C$; $\angle B \cong \angle D$
3. vertical angles
4. $\angle E \cong \angle H$; $\angle F \cong \angle G$
5. Answers will vary.
6. Answers will vary.
7. $\angle E \cong \angle H$; $\angle F \cong \angle G$
8. vertical angles
9. $\angle A \cong \angle D$; $\angle B \cong \angle C$
10. Answers will vary.
11. Both parallel and non-parallel lines have vertical angles when cut by a transversal.

Congruence

Set 1: Parallel Lines and Transversals

Instruction

Station 2

Students will be given graph paper, a ruler, and a protractor. Students will use the graph paper and ruler to model parallel lines cut by a transversal. They will use the protractor to find supplementary angles. Then they will use the graph paper to model lines, which are not parallel, that are cut by a transversal. They will use the protractor to find supplementary angles. They will describe which types of angles are supplementary angles when two lines are cut by a transversal.

Answers

1. $\angle A$ and $\angle B$; $\angle C$ and $\angle D$; $\angle E$ and $\angle F$; $\angle G$ and $\angle H$; $\angle A$ and $\angle C$; $\angle B$ and $\angle D$; $\angle E$ and $\angle G$; $\angle F$ and $\angle H$
2. Answers will vary.
3. $\angle A$ and $\angle B$; $\angle C$ and $\angle D$; $\angle E$ and $\angle F$; $\angle G$ and $\angle H$; $\angle A$ and $\angle C$; $\angle B$ and $\angle D$; $\angle E$ and $\angle G$; $\angle F$ and $\angle H$
4. Answers will vary.
5. adjacent angles; interior angles on the same side of the transversal but only when the transversal intersects parallel lines.

Station 3

Students will be given spaghetti noodles, a protractor, graph paper, and a ruler. Students will use the graph paper and spaghetti noodles to model parallel lines cut by a transversal. They will use the protractor to measure the angles created by the transversal. Then they will explore and define the exterior, interior, alternate exterior, and alternate interior angles created by the transversal.

Answers

1. 8 angles
2. interior
3. exterior
4. 1, 2, 7, 8
5. 3, 4, 5, 6
6. Answers will vary.
7. $m\angle 1 = m\angle 7$; $m\angle 2 = m\angle 8$; $m\angle 3 = m\angle 5$; $m\angle 4 = m\angle 6$
8. 4 and 6; 3 and 5
9. 1 and 7; 2 and 8
10. equal; equal

Congruence

Set 1: Parallel Lines and Transversals

Instruction

Station 4

Students will be given spaghetti noodles, a protractor, and two parallel lines cut by a transversal. Students will use the spaghetti noodles to model the letter “F” to find corresponding angles. Then they will use the protractor to measure the angles and justify their answer.

Answers

1. 3 and 7
2. 1 and 5; 2 and 6; 3 and 7; 4 and 8
3. Answers will vary.
4. Answers will vary.

Materials List/Setup

Station 1 graph paper; ruler; protractor

Station 2 graph paper; ruler; protractor

Station 3 dry spaghetti noodles; protractor; graph paper; ruler

Station 4 dry spaghetti noodles; protractor

Congruence

Set 1: Parallel Lines and Transversals

Instruction

Discussion Guide

To support students in reflecting on the activities and to gather some formative information about student learning, use the following prompts to facilitate a class discussion to “debrief” the station activities.

Prompts/Questions

1. How many angles are created when parallel or non-parallel lines are cut by a transversal?
2. What are exterior angles?
3. What are interior angles?
4. What is a vertical angle?
5. What are alternate exterior angles?
6. What are alternate interior angles?
7. What two types of angles are supplementary when parallel lines are cut by a transversal?

Think, Pair, Share

Have students jot down their own responses to questions, then discuss with a partner (who was not in their station group), and then discuss as a whole class.

Suggested Appropriate Responses

1. 8 angles
2. Exterior angles lie on the outside of the lines cut by the transversal.
3. Interior angles lie in between the two lines cut by the transversal.
4. Vertical angles are two angles formed by two intersecting lines that lie on opposite sides of the point of intersection.
5. Alternate exterior angles are pairs of angles on opposite sides of the transversal that are outside of the parallel or non-parallel lines.
6. Alternate interior angles are pairs of angles on opposite sides of the transversal that are inside the parallel or non-parallel lines.
7. Interior angles on the same side of the transversal and adjacent angles are supplementary in this situation.

Congruence

Set 1: Parallel Lines and Transversals

Instruction

Possible Misunderstandings/Mistakes

- Not finding corresponding angles correctly and identifying that they have the same measure if the lines cut by the transversal are parallel
- Mixing up interior and exterior angles
- Not realizing vertical angles are always equal whether or not the lines cut by the transversal are parallel
- Not realizing that alternate interior or exterior angles must be on the opposite side of the transversals

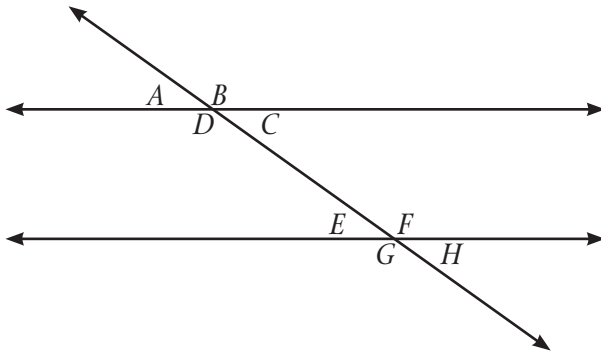
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Congruence

Set 1: Parallel Lines and Transversals

Station 1

At this station, you will find graph paper, a ruler, and a protractor. As a group, construct two parallel lines that are cut by a transversal and label the angles as shown in the diagram below.



1. Use the protractor to measure the following angles:

$$m \angle A = \underline{\hspace{2cm}} \quad m \angle B = \underline{\hspace{2cm}} \quad m \angle C = \underline{\hspace{2cm}} \quad m \angle D = \underline{\hspace{2cm}}$$

2. Which pairs of angles are equal in problem 1?

3. The pairs of angles found in problem 2 have a special name. What are these angles called?
(*Hint: Think about their location in relation to each other.*)

4. What pairs of angles are congruent for angles E , F , G , and H ?

5. What strategy did you use to find the angle pairs in problem 4?

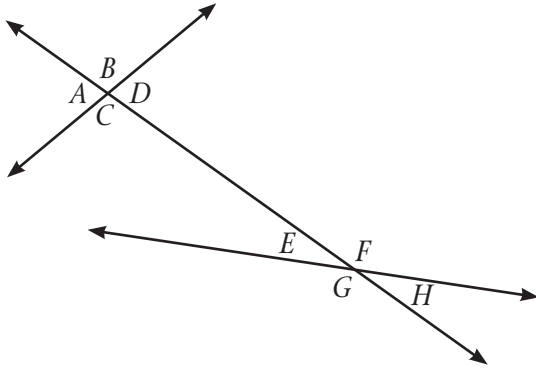
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NAME: _____

Congruence

Set 1: Parallel Lines and Transversals

On your graph paper, construct a new graph of two lines that are NOT parallel. These lines are cut by a transversal. Label the angles as shown in the diagram below.



6. Use the protractor to measure the following angles:

$$m \angle E = \underline{\hspace{2cm}} \quad m \angle F = \underline{\hspace{2cm}} \quad m \angle G = \underline{\hspace{2cm}} \quad m \angle H = \underline{\hspace{2cm}}$$

7. Which pairs of angles are equal?

8. The pairs of angles found in problem 7 have a special name. What are these angles called?
(*Hint: Think about their location in relation to each other.*)

9. What pairs of angles are congruent for angles A , B , C , and D ?

10. What strategy did you use to find the angle pairs in problem 9?

11. Based on your observations in problems 1–10, vertical angles can be found for what types of lines cut by a transversal?

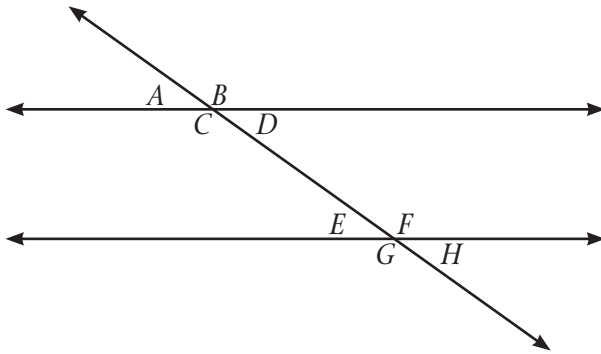
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Congruence

Set 1: Parallel Lines and Transversals

Station 2

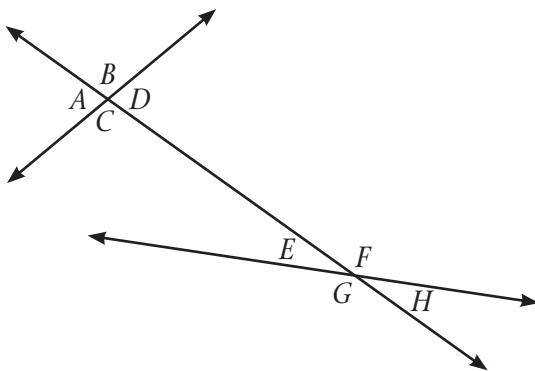
At this station, you will find graph paper, a ruler, and a protractor. As a group, construct two parallel lines that are cut by a transversal and label the angles as shown in the diagram below.



1. Which angles are supplementary angles?
2. Use your protractor to justify your answer to problem 1 by recording the measurements of each angle below.

$$\begin{array}{cccc} m \angle A = \underline{\hspace{2cm}} & m \angle C = \underline{\hspace{2cm}} & m \angle E = \underline{\hspace{2cm}} & m \angle G = \underline{\hspace{2cm}} \\ m \angle B = \underline{\hspace{2cm}} & m \angle D = \underline{\hspace{2cm}} & m \angle F = \underline{\hspace{2cm}} & m \angle H = \underline{\hspace{2cm}} \end{array}$$

On your graph paper, construct a new graph of two lines that are NOT parallel. These lines are cut by a transversal. Label the angles as shown in the diagram below.



3. Which angles are supplementary angles?

continued

NAME: _____

Congruence

Set 1: Parallel Lines and Transversals

4. Use your protractor to justify your answer to problem 3 by recording the measurements of each angle below.

$$m \angle A = \underline{\hspace{2cm}} \quad m \angle C = \underline{\hspace{2cm}} \quad m \angle E = \underline{\hspace{2cm}} \quad m \angle G = \underline{\hspace{2cm}}$$

$$m \angle B = \underline{\hspace{2cm}} \quad m \angle D = \underline{\hspace{2cm}} \quad m \angle F = \underline{\hspace{2cm}} \quad m \angle H = \underline{\hspace{2cm}}$$

5. Based on your answers and observations in problems 1–4, which of the following types of angles are supplementary?

vertical angles adjacent angles alternate interior angles

alternate exterior angles interior angles on the same side of the transversal

NAME: _____

Congruence

Set 1: Parallel Lines and Transversals

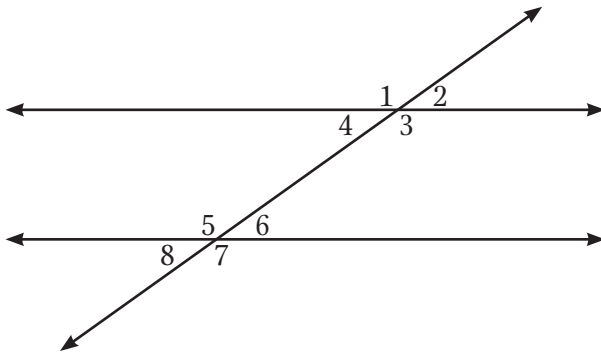
Station 3

At this station, you will find spaghetti noodles, a protractor, graph paper, and a ruler. Follow the directions below, and then answer the questions.

- On the graph paper, construct two parallel horizontal lines.
- Construct a diagonal line that passes through both parallel lines. This line is called a transversal.

1. How many angles does this transversal create with the two parallel lines?

On your graph paper, label the angles to model the parallel lines and transversal shown below.



Place a spaghetti noodle on each parallel line.

2. Are the angles between the spaghetti noodles called exterior or interior angles?

3. Are the angles above the top parallel spaghetti noodle and below the bottom spaghetti noodle called exterior or interior angles?

continued

NAME: _____

Congruence

Set 1: Parallel Lines and Transversals

4. Which angles are exterior angles? _____

5. Which angles are interior angles? _____

6. Use your protractor to measure each angle. Write the angle measurements below.
 $m \angle 1 =$ _____ $m \angle 3 =$ _____ $m \angle 5 =$ _____ $m \angle 7 =$ _____
 $m \angle 2 =$ _____ $m \angle 4 =$ _____ $m \angle 6 =$ _____ $m \angle 8 =$ _____

7. Based on your answers in problem 6, which pairs of interior and which pairs of exterior angles are equal?

8. Based on your answers in problems 6 and 7, which angles are alternate interior angles?

9. Based on your answers in problems 6 and 7, which angles are alternate exterior angles?

10. Based on your observations, alternate interior angles have _____ measure.
Alternate exterior angles have _____ measure.

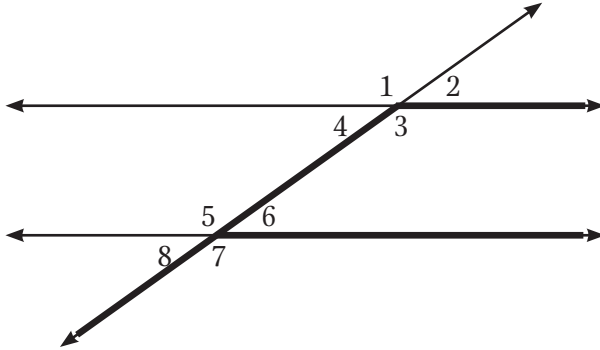
NAME: _____

Congruence

Set 1: Parallel Lines and Transversals

Station 4

At this station, you will find spaghetti noodles, a protractor, and parallel lines cut by a transversal.



The letter “F” has been drawn on the diagram above in a bold line. Place spaghetti noodles on the “F”.

1. What angles are at the inside corners of the “F”? _____

These are called *corresponding angles*.

2. Move the spaghetti noodles around to create more “F’s” that help you find the corresponding angles. Write the pairs of corresponding angles in the space below.

3. What strategy did you use to move the letter “F” around to help you find the corresponding angles?

4. Use your protractor to measure each angle to justify your answers for problem 2.

$$m \angle 1 = \underline{\quad\quad} \quad m \angle 3 = \underline{\quad\quad} \quad m \angle 5 = \underline{\quad\quad} \quad m \angle 7 = \underline{\quad\quad}$$

$$m \angle 2 = \underline{\quad\quad} \quad m \angle 4 = \underline{\quad\quad} \quad m \angle 6 = \underline{\quad\quad} \quad m \angle 8 = \underline{\quad\quad}$$