

Student Guide

Slides, Flips, and Turns

Questions 1–10 (SG pp. 413–417)

1. Professor Peabody used a slide to move the core square to make the quilt design.
2. Ming flipped the core square over the right edge, then over the top edge, then over the left edge of the core square to make the quilt design.
3. Jackie turned the core square around the upper right corner of the core square to make her quilt design.
4. **A.** Quilt Design Y
B. Flipping the core square over the right edge, then the top edge, then the left edge of the core square can make Quilt Design X.
C. Turning the core square by $\frac{1}{4}$ turns around the upper right corner of the core square can make Quilt Design X.
5. **A.** I do not agree with Romesh. Flipping the core square did not create the design. It looks like it was rotated.
B. The core square is turned around Point E and a copy of the quilt square is made at each $\frac{1}{4}$ turn.

1. How did Professor Peabody move the core square before making each of the three copies? Did Professor Peabody flip, slide, or turn the core square to make the quilt design?

Moving the core square is called a **transformation**.

The core square can:

Slide or Translate

core square copy

Flip or Reflect

core square copy

Turn or Rotate

core square copy

2. Ming used the same core square as Professor Peabody but made a different quilt design.

Ming

Quilt Design

Use a core square cut from the *Student Activity Book* page to find how Ming moved his core square to make his quilt design.

3. Jackie used the same core square to make her quilt design.

Jackie

Quilt Design

Use a core square to find how Jackie moved her core square to make her quilt design.

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4. John drew a more complicated core square.

Quilt Design X

Quilt Design Y

core square

- A. Which design can be made by sliding the core square?
- B. Which design can be made by flipping the core square?
- C. Which design can be made by turning the core square?

5. Romesh tried to describe the transformations needed to create the quilt design below.

Romesh

The core square is flipped over DF and then over BH and so on.

Quilt Design ACIG

core square

- A. Do you agree with Romesh? Why or why not?
- B. Describe the slides, flips, and turns of the core square that can be used to make quilt design ACIG.

Use the *Create Your Own Quilt Design* page in the *Student Activity Book* to make a unique design.

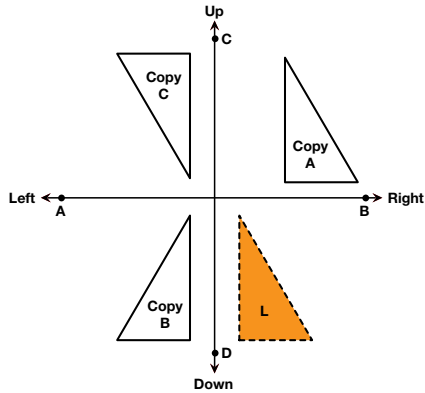
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Flips, Slides, and Turns of Shapes

Mathematicians use flips, slides, and turns to describe how shapes can move. Use an orange triangle (Polygon L) to see how the shaded triangle can move to make Copy A, Copy B, and Copy C. Try slides, flips, and turns.

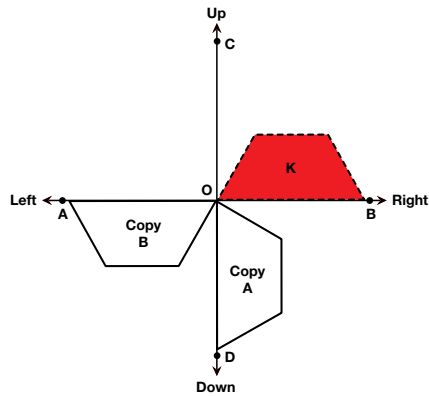


6. Use words to tell how the triangle moves. Start at the shaded triangle each time.
- A. From the shaded triangle to Copy A
 - B. From the shaded triangle to Copy B
 - C. From the shaded triangle to Copy C
7. With your group, make a list of words and phrases that can help you tell how the triangle moves.

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8. John rotates or turns the red trapezoid (K) around Point O.



- A. If John continues to rotate the trapezoid, where will Copy C be? Draw a sketch.
- B. Describe the location of Copy C.

Remove the *More Slides, Flips, and Turns* page from the *Student Activity Book* to practice transforming more shapes.

Congruence

Congruent shapes have the same size and shape. Shapes are congruent if you can move one shape so it fits on top of the other and they match exactly.

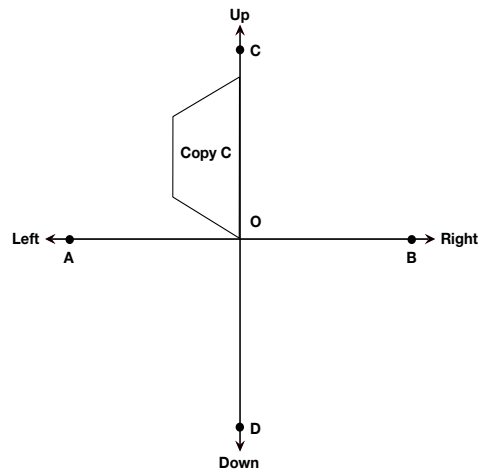
The shaded triangle is congruent to the copies in Question 6.

The shaded trapezoid is congruent to the copies in Question 8.

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- 6. A. Shape L slides up and to the right to make Copy A.
- B. Shape L is flipped over \overleftrightarrow{CD} to make Copy B.
- C. Shape L is flipped over \overleftrightarrow{CD} and then over \overleftrightarrow{AB} . Or, Shape L can be turned around the point of \overleftrightarrow{AB} and \overleftrightarrow{CD} 's intersection.
- 7. This list will vary. Possible response: flip or reflect, slide or translate, turn or rotate, flip over the \overleftrightarrow{AB} , turn around point A, slide up and to the right, slide down and to the left, half-turn, quarter-turn, and so on.
- 8. A.



- B. The long side of the trapezoid is on line \overleftrightarrow{CD} and the vertex is at point O.

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9. A. X and Y are flips over \overleftrightarrow{CD} . V and W are not because they are not the same distance from \overleftrightarrow{CD} .
- B. Answers will vary. The Pentagon W can slide to the left to make Pentagon V, or Pentagon W is flipped over \overleftrightarrow{CD} and then slid to the right to make Pentagon V.
- C. X and Y are congruent; V and W are congruent
10. A. Pentagon S flips over \overleftrightarrow{AB} to make Pentagon T.
- B. Answers will vary. Slide Triangle Q over \overleftrightarrow{AB} and rotate clockwise around the right angle. Or, flip Triangle Q over \overleftrightarrow{AB} , then flip it over \overleftrightarrow{CD} , then slide it to the left.
- C. Shapes R and Q are congruent and Shapes T and S are congruent.

9. A. Which of the following pairs of shapes are flips over \overleftrightarrow{CD} ?

B. How can the shaded pentagon move to the white copy?
C. Which pairs of shapes are congruent?

10. A. Which of the following pairs of shapes are flips over \overleftrightarrow{AB} ?

B. How can the shaded triangle move to the white copy?
C. Which pairs of shapes are congruent?

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Homework

Questions 1–4 (SG p. 418)

- Design A can be made by sliding the core square.
- Designs C, D, and F can be made by flipping the core square.
- Designs B, E, and F can be made by turning the core square.
- A. The shaded triangle is flipped over \overleftrightarrow{AB} to make Copy A.
B. The shaded triangle slides down and to the right to make Copy B.
C. The shaded triangle is turned or rotated around the bottom corner a half-turn to make Copy C.

Homework

Look at the quilt designs below. Each core square is outlined with dotted lines.

Quilt Design A Quilt Design B Quilt Design C
Quilt Design D Quilt Design E Quilt Design F

- Which quilt designs can be made by sliding the core square?
- Which quilt designs can be made by flipping the core square?
- Which quilt designs can be made by turning the core square?
- Use words to tell how the shaded triangle moves.
 - From the shaded triangle to Copy A
 - From the shaded triangle to Copy B
 - From the shaded triangle to Copy C

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