

Common Core Standards Practice

Week 7

Selected Response

1. If $\triangle ABC \cong \triangle DEF$, which of the following statements is true?

- A $\overline{CB} \cong \overline{FE}$
- B $\overline{AC} \cong \overline{DE}$
- C $\overline{AC} \cong \overline{EF}$
- D $\overline{BC} \cong \overline{DE}$

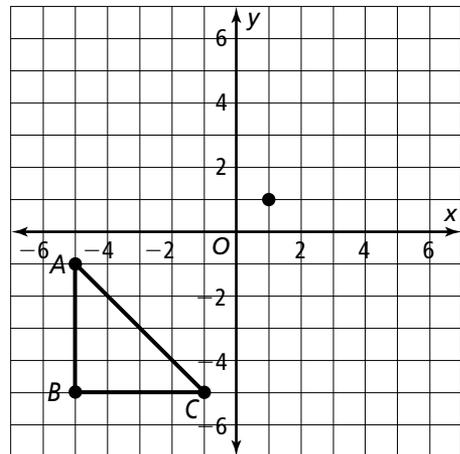
Constructed Response

2. Consider the points $J(2, 3)$, $K(5, 7)$, $L(8, 3)$, $M(-2, 1)$, $N(1, 5)$, $O(4, 1)$.
Is $\triangle JKL \cong \triangle MNO$? Justify your answer.

Extended Response

3. a. Construct a triangle that is congruent to the triangle shown below. The entire triangle must be in the first quadrant, $m\angle B = 90^\circ$, and one vertex must be at $(1, 1)$.

b. Which postulate proves that the triangles are congruent? Explain.





OVERVIEW

Looking Back	Mathematics of the Week	Looking Ahead
In previous grades students have worked with similar triangles in a variety of ways (8.G.A.4, 8.G.A.5).	Students should understand the properties of congruent triangles, how to determine whether triangles are congruent, and how to use congruent triangles to solve problems.	In Chapter 9, students will revisit congruent triangles when working with congruence transformations (G.CO.B.7).

COMMON CORE CONTENT STANDARDS

G.CO.C.10 Prove theorems about triangles.

G.SRT.B.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Mathematical Practice Standards: 1, 2, 3, 6

TEACHING NOTES

Selected Response

1. *Error Analysis:* Students show understanding of the definition of congruent triangles. If a student answers B, C, or D, he or she is confusing the order of the vertices and is not matching corresponding parts of congruent triangles.

Constructed Response

2. Students use the Distance Formula to compare triangles. Discuss with students triangle congruence by the SSS Postulate. Using the two given triangles, have volunteers describe corresponding angles and sides. Ask students how they will know which postulate to use in this exercise. Then ask them to describe a plan of how they will solve the exercise. As students work, make sure they compare the correct corresponding sides as they find the lengths of the sides.

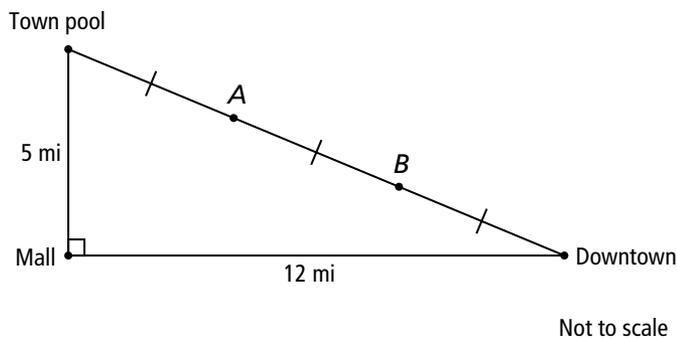
Extended Response

3. Students show understanding of the triangle congruence postulates. Remind students that congruent figures have the same size and shape. If time permits, work through an example of constructing a congruent triangle to a shape you create, similar to the exercise. When you present your example, make sure to include two to three restrictions similar to those in the exercise. As you complete the example for students, note the steps you take to make sure all restrictions are met. As students begin the exercise, ask them to consider a plan when constructing the congruent triangle. When students explain the postulate that proves the triangles are congruent, make sure the postulate corresponds to the reasoning they present.

Performance Task: Urban Planning

Complete this performance task in the space provided. Fully answer all parts of the performance task with detailed responses. You should provide sound mathematical reasoning to support your work.

Students are designing a new town as part of a social studies project on urban planning. They want to place the town's high school at point A and the middle school at point B . They also plan to build roads that run directly from point A to the mall and from point B to the mall. The average cost to build a road in this area is \$550,000 per mile.



Task Description

What is the difference in the cost of the roads built to the mall from the two schools?

- Find the measure of each acute angle of the right triangle shown.
- Find the length of the hypotenuse. Also find the length of each of the three congruent segments forming the hypotenuse.

Performance Task: Urban Planning (continued)

c. Draw the road from point *A* to the mall and find its length.

d. Draw the road from point *B* to the mall and find its length.

e. How much farther from the mall is point *B* than point *A*? How much more will it cost to build the longer road?

Performance Task 2 Scoring Rubric

Urban Planning

The Scoring Rubric proposes a maximum number of points for each of the parts that make up the Performance Task. The maximum number of points is based on the complexity and difficulty level of the sub-task. For some parts, you may decide to award partial credit to students who may have shown some understanding of the concepts assessed, but may not have responded fully or correctly to the question posed.

Task Parts	Maximum Points
<p>a. Downtown angle: $\tan^{-1}\left(\frac{5}{12}\right) = 22.6^\circ$.</p> <p>Town Pool angle: $\tan^{-1}\left(\frac{12}{5}\right) = 67.4^\circ$.</p>	2
<p>b. Hypotenuse h: $h^2 = 5^2 + 12^2 = 25 + 144 = 169$, so $h = 13$.</p> <p>Length of each of the three congruent segments = $\frac{13}{3}$ mi, or about 4.3 mi.</p>	4
<p>c. Let a = length of the road from point A to the mall.</p> <p>Use the Law of Cosines: $a^2 = 5^2 + \left(\frac{13}{3}\right)^2 - 2(5)\left(\frac{13}{3}\right)\cos 67.4^\circ$, so $a \approx 5.2$ mi.</p>	4
<p>d. Let b = length of the road from point B to the mall.</p> <p>Use the Law of Cosines: $b^2 = 12^2 + \left(\frac{13}{3}\right)^2 - 2(12)\left(\frac{13}{3}\right)\cos 22.6^\circ$, so $b \approx 8.2$ mi.</p>	4
<p>e. Since $8.2 - 5.2 = 3$, point B is about 3 miles further from the mall than point A is. At \$550,000 per mile, the cost to build the longer road is $3(\\$550,000) = \\$1,650,000$ more.</p>	4
Total Points	18