The SAT Initiative

G6 Topic Breakdown

SOL - Geometry

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GOAL → The student, given information in the form of a figure or statement, will prove two triangles are congruent, using algebraic and coordinate methods.

***Congruent Triangles* =** *Two triangles are exactly the same size.*

- Use angle and side lengths to prove if triangles are congruent or not

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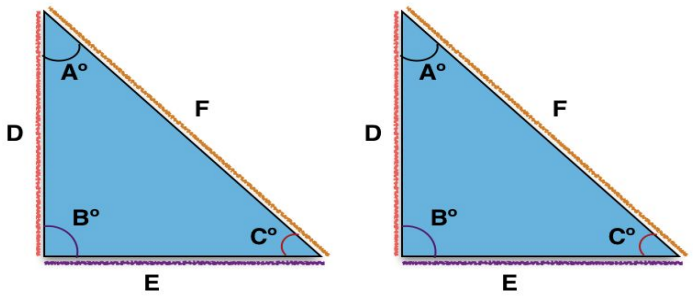
Overall Task : You are given two triangles and must figure out if they are congruent are not.

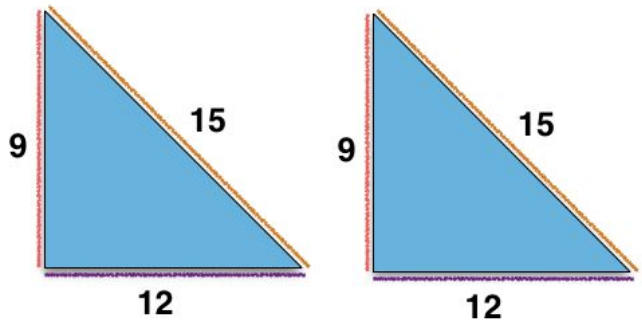


Strategy : Using whichever angles & sides you are given in the problem, use one of *FOUR* methods to prove the triangles are congruent.

Method #1: Side - Side - Side

This method is used when you are GIVEN ALL THREE SIDES of both triangles.

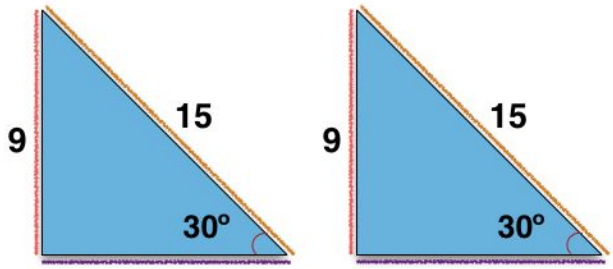
9, 12, 15 = 9, 12, 15



Method #2: Side - Angle - Side

This method is used when you are GIVEN TWO SIDES AND ONE ANGLE of both triangles.

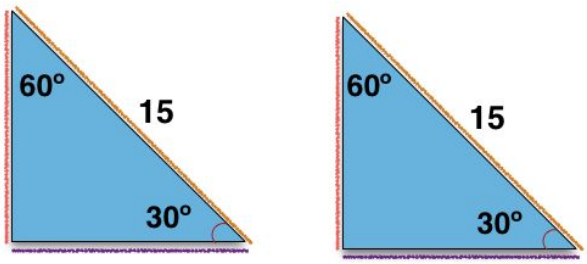
9, 30°, 15 = 9, 30°, 15



Method #3: Angle - Side - Angle

This method is used when you are GIVEN TWO ANGLES AND ONE SIDE of both triangles.

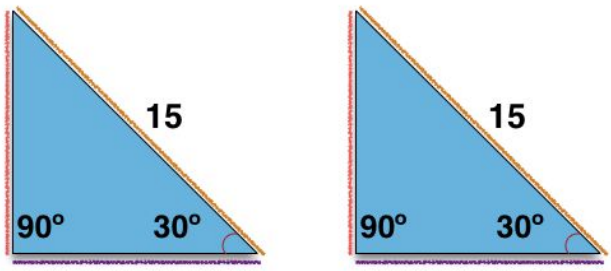
30°, 15, 60° = 30°, 15, 60°



Method #4: Angle - Angle - Side

This method is used when you are GIVEN TWO ANGLES AND ONE SIDE of both triangles.

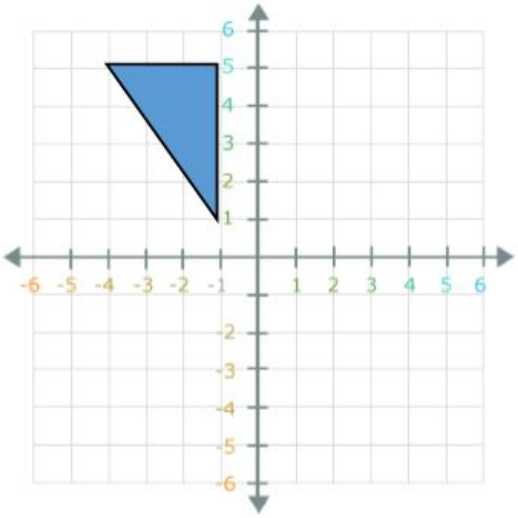
30°, 90°, 15 = 30°, 90°, 15



Strategy : Prove two triangles are congruent using coordinate methods, if the triangle is given on an x-y graph.

*[Use the **distance formula** here to measure the length of each side of this triangle **or** **count the boxes** to find the length of each side]*

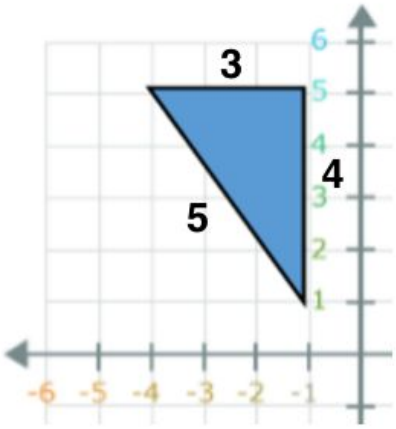
$$\text{Distance} = \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$$



Which of the following vertices could be the points of another congruent triangle?

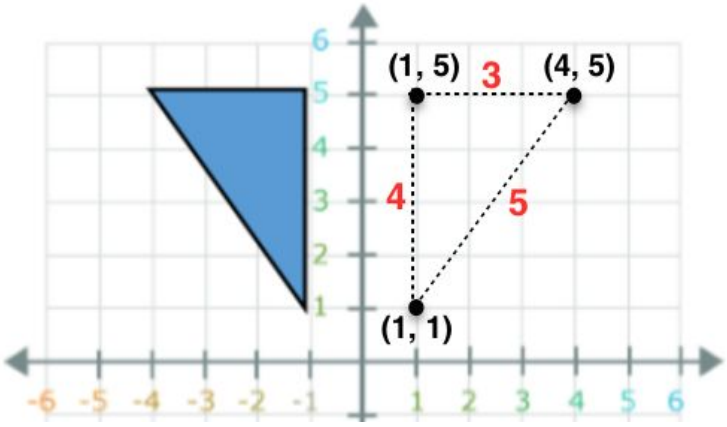
A) (0,0) , (3,4) , (0,5)
B) (0,0) , (-5,0) , (0,5)
C) (1, 1), (1, 5), (4, 5)
D) (-1,1) , (-1,4) , (2,1)

Step 1 → Find side lengths 5



Step 2 → Choose vertices that form side lengths of 3 - 4 - 5

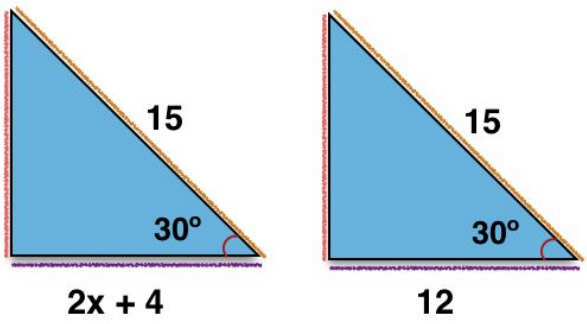
(1, 1) (1, 5) (4, 5)



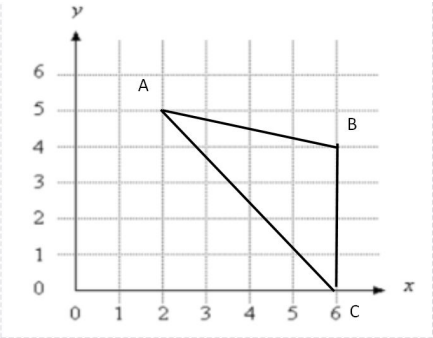
Strategy : Use algebra to prove that two triangles are congruent

- Use your knowledge of S-S-S, S-A-S, A-S-A, A-A-S congruence rules

Find the value of *x* that makes the two triangles congruent...

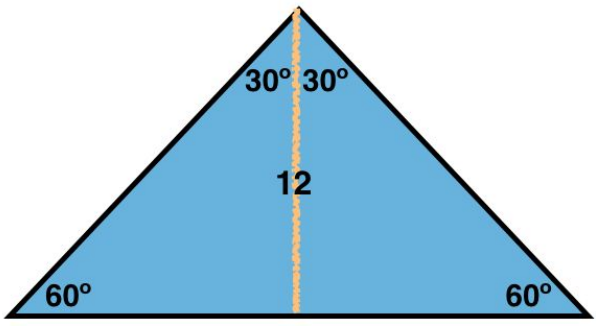


1. **Identify a method : S-A-S**
2. **Solve for missing side / angle**
3. **Side = Side**
4. **2x + 4 = 12**
5. **2x = 8**
6. **x = 4**
7. **12 = 12**



Task : Prove that two triangles - that have a *reflexive side*- are congruent

- **Reflexive Side** → A side that is shared by two triangles; considered a congruent side for the two triangles

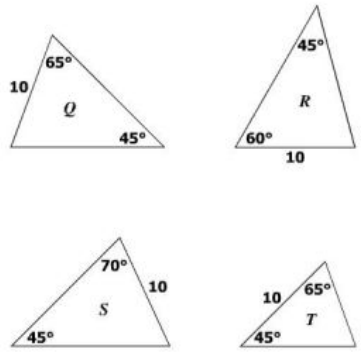


- **Identify the shared side (12)**
- **Identify a method (A - A - S)**

The triangle is congruent by A - A - S

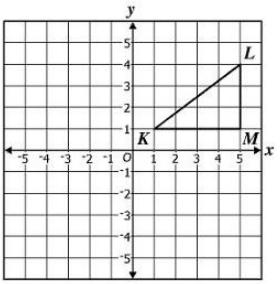
30° - 60° - 12

Given the measures shown in the diagram, which two triangles are congruent?



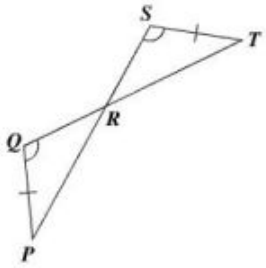
- **A** Q and S
- **B** R and T
- **C** R and S
- **D** Q and T

The coordinate values of the vertices of $\triangle KLM$ are integers.



Which set of coordinate pairs could represent the vertices of a triangle congruent to $\triangle KLM$?

- **A** $\{(0, 0), (3, 4), (0, 5)\}$
- **B** $\{(0, 0), (-5, 0), (0, 4)\}$
- **C** $\{(-1, 1), (-4, 5), (-1, 5)\}$
- **D** $\{(-1, 1), (-1, 4), (2, 1)\}$



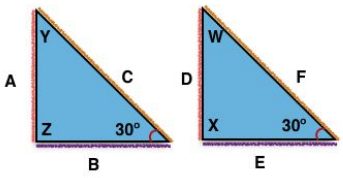
Using the information given, which congruence postulate or theorem can be used to prove that $\triangle PQR \cong \triangle TSR$?

- **A** Side-Side-Side Postulate
- **B** Side-Angle-Side Postulate
- **C** Hypotenuse-Leg Theorem
- **D** Angle-Angle-Side Theorem

Practice Problems

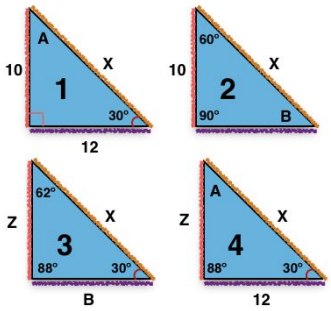
G.6 Review

1. Given triangle ABC ≅ DEF, knowing which pair of variables would be useful in proving this?



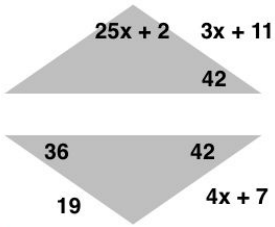
A) C/F and A/D
B) Y/W and Z/X
C) B/E and A/D
D) Z/X and A/D

2. Which 2 of the following triangles are congruent to each other?



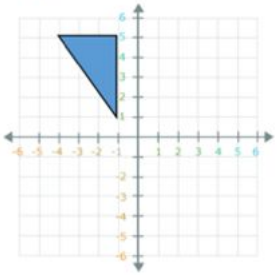
A) 3 and 4
B) 1 and 2
C) 2 and 3
D) 4 and 1

3. What is the length of the side labeled "3x + 11" if the two triangles are congruent?



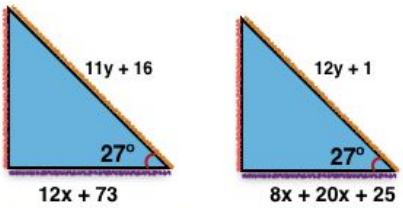
A) 4
B) 23
C) 19
D) 36

4. Which of the following could be points on a congruent triangle to triangle Z?



A) (2,6), (5,6), (0,2)
B) (1, 4), (1,1), (5,1)
C) (1,-1), (4,-1), (4,-5)
D) (0,-1), (1,-5), (-1, 6)

5. Solve for the values of x and y that make the two triangles congruent.

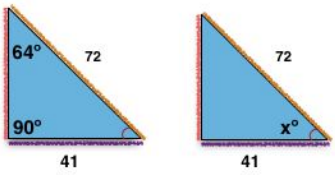


A) x = 3, y = 15
B) x = 16, y = 12
C) x = 15, y = 12
D) x = 15, y = 25

6. Which of the following can not be used to determine the congruency of two triangles?

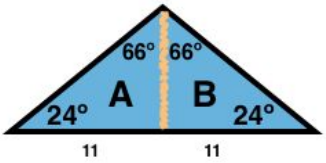
A) Angle - Angle - Angle
B) Side - Side - Side
C) Side - Angle - Side
D) Angle - Angle - Side

7. Solve for the missing value of x that makes the two triangles congruent.



A) 64
B) 26
C) 30
D) 41

8. Which of the following method makes triangle A and B congruent?



A) S - S - A
B) S - S - S
C) A - S - S
D) A - A - S

9. Determine if the two triangles in the following scenario are congruent:

Triangle A has angles of 90, 54, and a third unknown angle. Its sides measure 9,12, and 15. Triangle B has a known angle that measures 36. It only has one known side of 12.

A) True
B) False

Answer Key: Practice Problems

G.6 Geometry

1.	**D**
2.	**B**
3.	**B**
4.	**C**
5.	**A**
6.	**A**
7.	**B**
8.	**D**
9.	**A**