

Geometry - Congruent Triangles and Rigid Motions - Worksheet

Common Core G-CO.B.7, G-CO.B.8 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

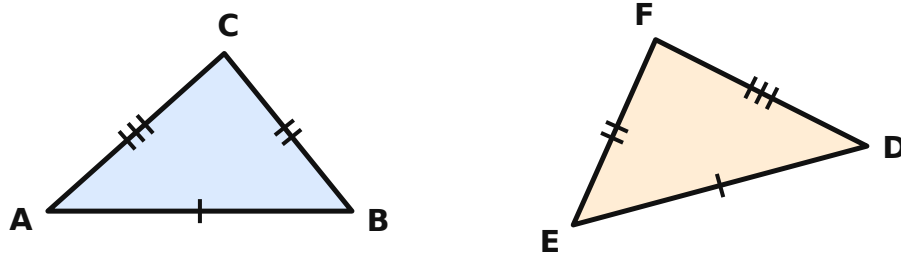
These 20 problems practice congruent triangles, corresponding parts and congruence tests (Common Core G-CO.B.7, G-CO.B.8). The first problems are quick one-step checks of the definitions and formulas from the lesson. The middle problems ask for diagrams, equations and careful reasoning in the style of a high school Geometry class. The last six problems are proofs and applied problems with trusses, ladders and surveying.

Geometry · Common Core State Standards: **G-CO.B.7, G-CO.B.8**

Exercise 1 - Corresponding parts

Triangle ABC is congruent to triangle DEF with vertices matching in order. If $m\angle A = 48^\circ$ and $BC = 9$, find $m\angle D$ and EF .

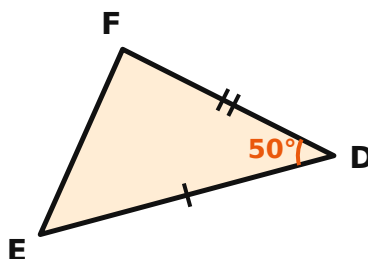
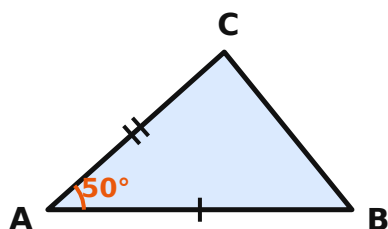
Exercise 2 - Name the test: SSS



SSS: three pairs of congruent sides.

Name the test that proves that triangle ABC is congruent to triangle DEF.

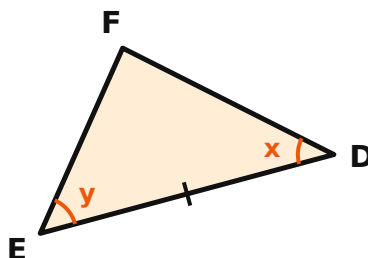
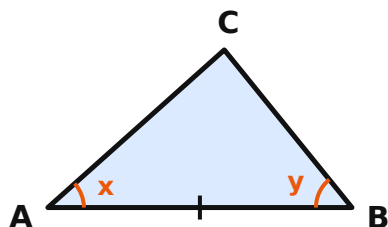
Exercise 3 - Name the test: SAS



SAS: two sides and the angle between them.

Name the test that proves the triangles congruent.

Exercise 4 - Name the test: ASA



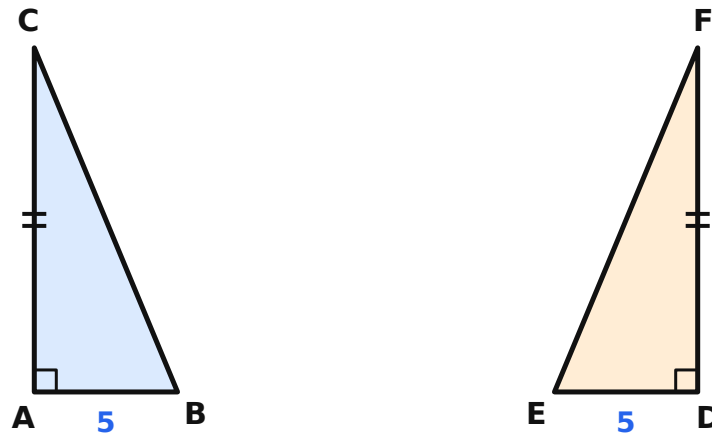
ASA: two angles and the side between them.

Name the test that proves the triangles congruent.

Exercise 5 - Name the test: AAS

Triangle PQR has $m\angle P = 40^\circ$, $m\angle Q = 75^\circ$ and $QR = 8$. Triangle XYZ has $m\angle X = 40^\circ$, $m\angle Y = 75^\circ$ and $YZ = 8$. Is there enough information to prove them congruent?

Exercise 6 - Name the test: HL



HL: right triangles with congruent hypotenuse and a congruent leg.

Both triangles are right triangles. Which test proves them congruent, and what is the length of the missing leg AC if the hypotenuse BC is 13?

Exercise 7 - Why SSA fails

Two triangles each have sides of length 6 and 8, and a 30° angle that is not between them. Explain why this is not enough to prove congruence.

Exercise 8 - Angles with x

Triangle ABC is congruent to triangle PQR. $m\angle A = (3x+5)^\circ$ and $m\angle P = (5x-21)^\circ$. Find x and $m\angle A$.

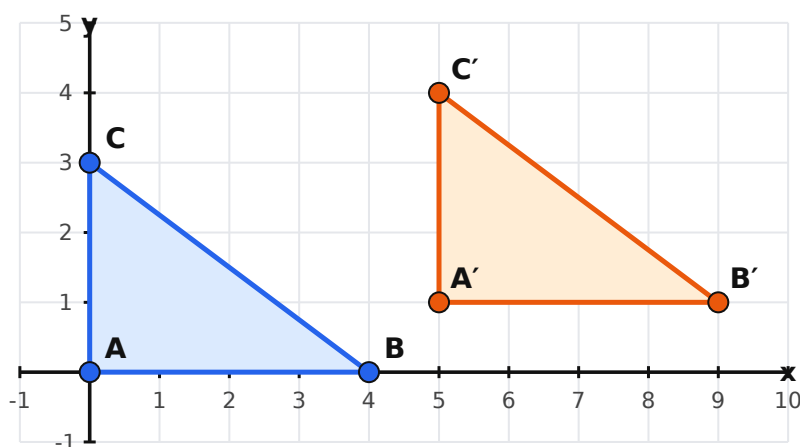
Exercise 9 - Sides with x

Triangle ABC is congruent to triangle DEF. $AB = 2x+3$ and $DE = 4x-9$. Find x and AB .

Exercise 10 - Missing side

Triangle ABC has sides $AB = 9$, $BC = 12$ and $CA = 15$. Triangle DEF is congruent to it with $DE = 9$ and $DF = 15$. Find EF and the perimeter of DEF.

Exercise 11 - Translation shows congruence



Triangle ABC and its translation.

Triangle ABC has $A(0, 0)$, $B(4, 0)$ and $C(0, 3)$. It is translated by $(x, y) \rightarrow (x + 5, y + 1)$ to give DEF. Find the side lengths of both triangles and name the congruence test that applies.

Exercise 12 - Reflection and distance

Triangle ABC has $A(1, 1)$, $B(5, 1)$ and $C(2, 4)$. Reflect it across the y-axis to get $A'B'C'$. Show that $AC = A'C'$ and $BC = B'C'$.

Exercise 13 - Which are congruent?

Triangle 1 has sides 3, 4, 5. Triangle 2 has sides 5, 3, 4. Triangle 3 has sides 3, 4, 6. Which pair is congruent, and by which test?

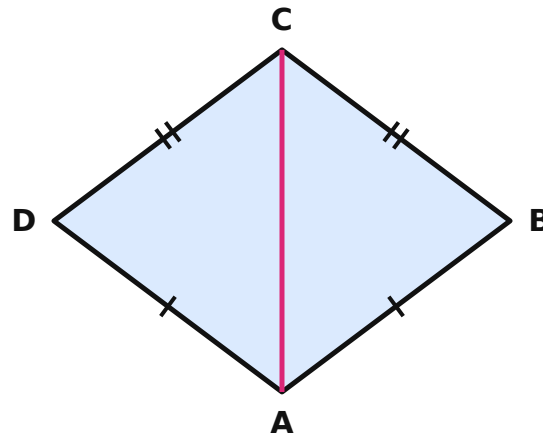
Exercise 14 - Included angle?

Triangle A has sides 6 and 8 with a 50° angle between them. Triangle B has sides 6 and 8 with a 50° angle that is opposite the side of length 8. Are the triangles necessarily congruent?

Exercise 15 - Choose the missing fact

Triangles ABC and DEF have $AB = DE$ and $m\angle B = m\angle E$. Name one more fact that proves them congruent by ASA, and one that proves them congruent by SAS.

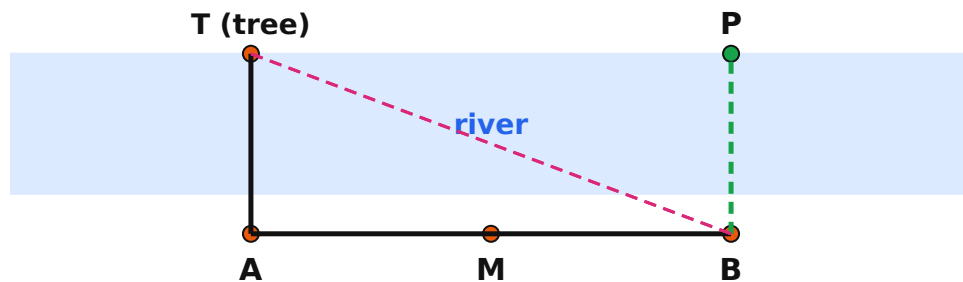
Exercise 16 - Bridge truss



Truss with shared side AC.

A truss has $AB = AD$ and $CB = CD$, and they share side AC. Prove that triangle ABC is congruent to triangle ADC, and find $m\angle BAC$ if $m\angle DAC = 38^\circ$.

Exercise 17 - River width



Stakes A, M and B with congruent triangles across the river.

Sofia wants the width of a river. She stands at A directly across from a tree T, walks 30 yards along the bank to M, then another 30 yards to B. She turns 90° and walks away from the river until the tree, M and P line up. She measures $BP = 42$ yards. Explain why the river width AT is 42 yards.

Exercise 18 - Ladders

Two ladders each 13 feet long lean against a vertical wall. Each one has its base 5 feet from the wall. Show the ladders reach the same height, and find that height.

Exercise 19 - Triangular flags

A school makes triangular flags. Each flag has sides of 18 inches and 24 inches with a 90° angle between them. Show that any two flags are congruent and find the longest side.

Exercise 20 - Crossing braces

Segments AD and BC cross at E, which is the midpoint of both. $AE = ED = 7$, $BE = EC = 5$ and $AB = 9$. Prove that triangle AEB is congruent to triangle DEC and find DC.