

Grade 7 · Drawing Geometric Figures and Constructing Triangles · Worksheet

Common Core 7.G.A.2 · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

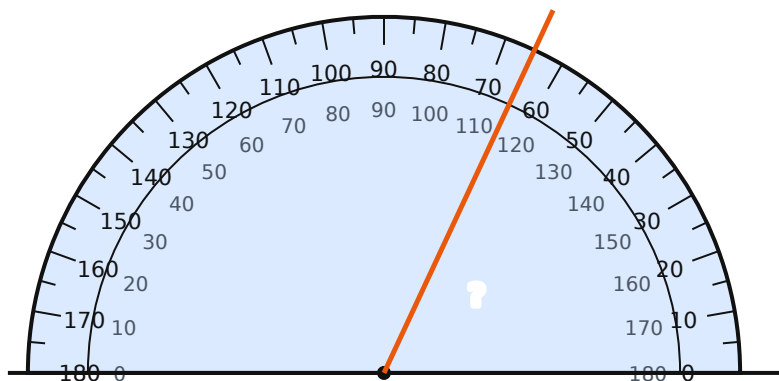
This worksheet gives 20 problems on drawing triangles from given conditions, aligned with Common Core standard 7.G.A.2. The first problems use a protractor, angle sums, and the triangle inequality to test side lengths and angle measures.

The middle problems ask how many triangles fit a set of measurements: exactly one, more than one, or none. The last six are word problems with sticks, trails, gardens, surveys, banners, and a compass. Check each answer against the conditions.

Grade 7 Common Core: 7.G.A.2

Problem 1: Reading a protractor

Maya places a protractor on an angle. One side of the angle lies on the 0 line at the right. Find the measure of the angle.



Angle measured with a protractor.

Problem 2: Triangle inequality check

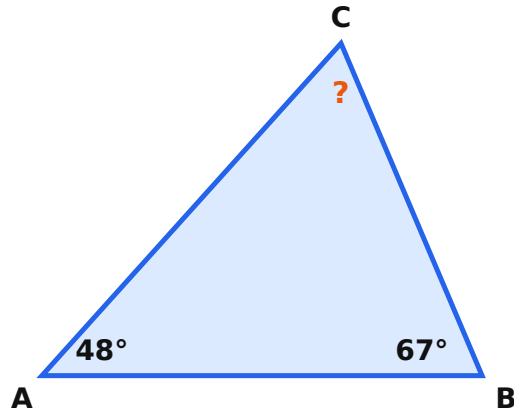
Tell whether each set of lengths (in inches) can be the sides of a triangle.

- a. 3, 4, 5
- b. 2, 3, 6

- c. 5, 5, 10
- d. 7, 8, 12

Problem 3: Third angle and type

Two angles of triangle ABC measure 48° and 67° , as shown. (a) Find the measure of angle C. (b) Classify the triangle as acute, right, or obtuse.



Triangle ABC with two known angles.

Problem 4: Angles of a triangle

Tell whether each set of angle measures can be the three angles of a triangle.

- a. 50° , 60° , 70°
- b. 90° , 60° , 40°
- c. 100° , 45° , 35°
- d. 62° , 59° , 58°

Problem 5: Decimal side lengths

Tell whether each set of lengths (in centimeters) can be the sides of a triangle. Show the sum of the two shorter sides.

- a. 1.5, 2.5, 4
- b. 2.5, 4, 6
- c. 3.2, 3.2, 6.3
- d. 0.8, 1.1, 2

Problem 6: Third side length

Two sides of a triangle measure 5 in. and 9 in. Find the smallest and largest whole-number lengths for the third side.

Problem 7: Isosceles bases

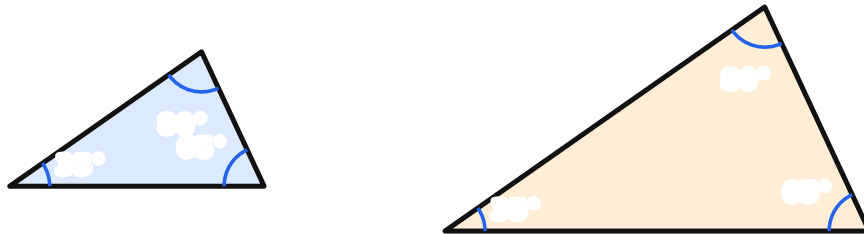
An isosceles triangle has two sides that are each 7 in. long. The third side, the base, is a whole number of inches. (a) Find the smallest and largest possible bases. (b) How many different whole-number bases are possible?

Problem 8: Angles x , $2x$, and $3x$

The three angles of a triangle measure x° , $2x^\circ$, and $3x^\circ$. Find x and each angle, then classify the triangle as acute, right, or obtuse.

Problem 9: Three angles

Both triangles below have angles of 35° , 65° , and 80° .

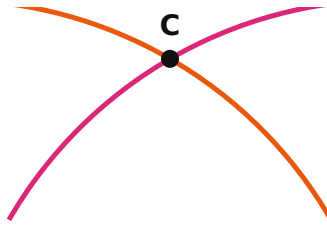


Two triangles with the same angles.

- Are the two triangles the same size?
- Do three angles always determine one triangle? Explain.

Problem 10: Equilateral triangle construction

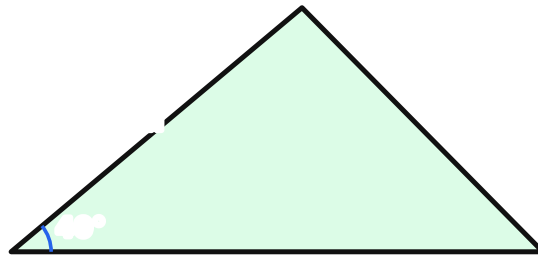
Draw segment AB that is 5 cm long. Set a compass to 5 cm, draw an arc from A and an arc from B, and mark C where the arcs cross, as shown. Then draw AC and BC. (a) Find the lengths of AC and BC. (b) Measure the angles with a protractor. (c) Could a classmate follow the same steps and draw a different triangle?



Compass arcs of radius 5 cm from A and B meet at C.

Problem 11: Two sides and an angle between

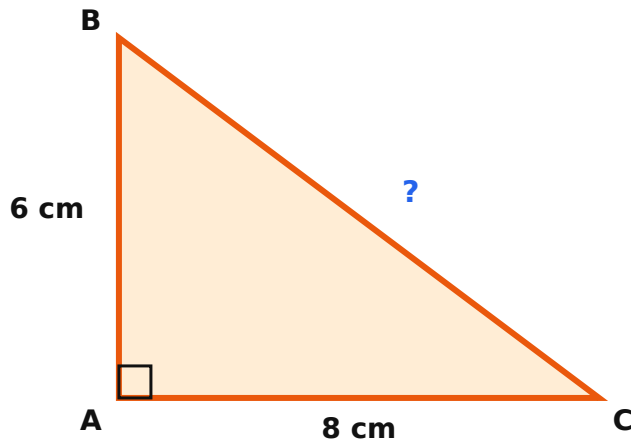
Jamal draws triangle ABC with $AB = 7 \text{ cm}$, $AC = 5 \text{ cm}$, and $\angle A = 40^\circ$. Sofia draws her own triangle with the same three measurements. Will the two triangles have the same size and shape? Explain.



Jamal's triangle.

Problem 12: Right angle between two sides

Draw an angle A of 90° . Mark B on one ray so that $AB = 6 \text{ cm}$ and C on the other ray so that $AC = 8 \text{ cm}$. Connect B and C, as shown. (a) Measure BC with a ruler. (b) Would every classmate who uses these three measurements get a triangle with the same size and shape? (c) Classify the triangle by its sides.



A triangle with a 90° angle between sides of 6 cm and 8 cm.

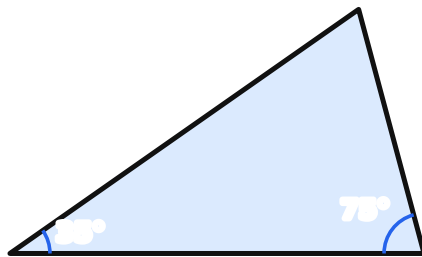
Problem 13: One, many, or none

Tell whether each set of measurements gives exactly one triangle, more than one triangle, or no triangle.

- Sides 4 cm, 5 cm, 6 cm
- Sides 3 in., 4 in., 8 in.
- Angles 20° , 70° , 90° (no side lengths)
- $\angle A = 80^\circ$, $\angle B = 35^\circ$, and $AB = 5$ cm
- Angles 100° , 90° , 10°

Problem 14: Two angles and a side

A triangle has $\angle A = 35^\circ$, $\angle B = 75^\circ$, and $AB = 8$ cm.



Triangle with two angles and the side between them.

- Find the measure of $\angle C$.
- How many different triangles have these measurements?

Problem 15: Stick triangle

Ethan has two sticks that are 7 in. and 10 in. long. A third stick is 18 in. long.

- Can the three sticks form a triangle? Explain.
- Ethan saws the 18 in. stick down to a whole-number length. Find the smallest and largest lengths that let the sticks form a triangle.

Problem 16: Hiking loop

Three campsites A, B, and C form a triangular hiking loop. The trail from A to B is 5 miles and the trail from B to C is 8 miles. The ranger plans a straight trail from C back to A that is a whole number of miles. (a) Find the possible lengths of the trail from C to A. (b) Find the shortest and longest possible loops. (c) Aisha wants a loop of exactly 20 miles. Can the ranger build it? If so, how long is CA?

Problem 17: Garden fence

Priya plans a triangular garden. Two sides measure 40 ft and 25 ft. The third side is a whole number of feet.

- Write the possible lengths of the third side.
- Find the smallest and largest possible perimeters of the garden.

Problem 18: Land survey

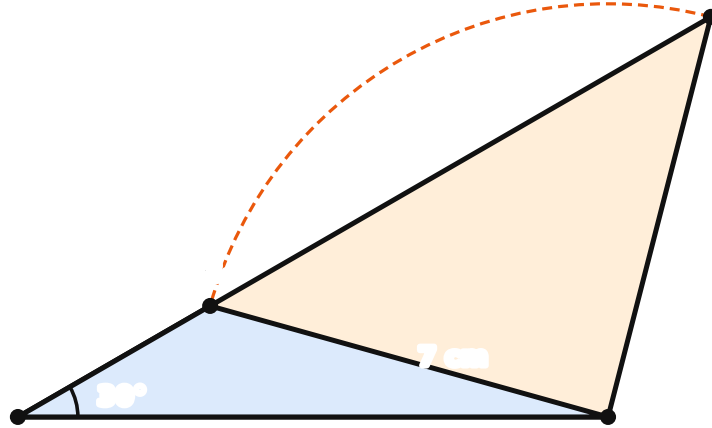
A surveyor stands at post A and post B, which are 120 ft apart. The angle at A to a tree T is 52° and the angle at B to the same tree is 71° . (a) Find the angle at the tree. (b) How many different triangles ATB match these measurements? (c) A helper says the angle at the tree is 60° . Explain how you know the helper is wrong.

Problem 19: Pennant banner

Maya makes a triangular pennant. The base is 12 in. and the other two sides are equal, each a whole number of inches s . (a) Jamal says $s = 6$ works. Explain why it does not. (b) Find the smallest whole-number value of s . (c) Find the least possible perimeter.

Problem 20: Two possible triangles

Diego draws a 30° angle at A and marks C 10 cm from A on one ray. He sets a compass to 7 cm, puts the point on C, and swings an arc across the other ray. The arc crosses the ray in two places, B_1 and B_2 , as shown.



Compass arc crossing the ray twice.

- How many different triangles can Diego make?
- Which triangle has the longer side AB?
- Does side-side-angle always give exactly one triangle? Explain.