

Building Triangles from Sides and Angles

Grade 7 math · Test · Standards: 7.G.A.2

Name: _____ Date: _____ Class: _____

This test covers the triangle inequality, angle sums and the conditions that give one triangle, more than one or none. Show the sums or checks that support each answer. A ruler is allowed for figures, but no protractor drawing is required. Plan on 45 minutes for the 8 questions.

Standards: 7.G.A.2 · **Level:** Grade 7

Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Triangle Inequality Tests (2 points)

Decide whether each set of lengths can form a triangle. Justify with the triangle inequality.

- a. 8 in, 11 in, 18 in (1 point)
- b. 9 in, 12 in, 21 in (1 point)

Question 2 Range of a Side (2 points)

Two sides of a triangle are 6 in and 15 in. Find the possible lengths of the third side.

Question 3 Third Angle (2 points)

A triangle has angles of 58° and 77° . Find the third angle and classify the triangle as acute, right or obtuse.

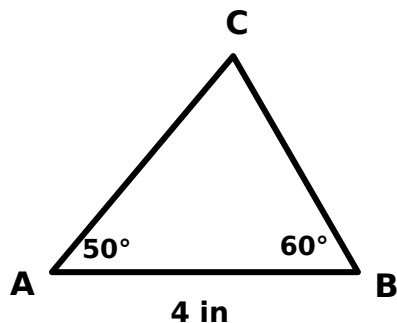
Question 4 Count the Triangles (3 points)

For each set of conditions, state whether exactly one triangle, more than one triangle or no triangle can be drawn.

- a. Sides of 7 in, 10 in and 12 in (1 point)
- b. Angles of 45° , 45° and 90° (1 point)
- c. Sides of 3 in, 5 in and 9 in (1 point)

Question 5 Triangle ABC (3 points)

Triangle ABC is drawn with a ruler and protractor.

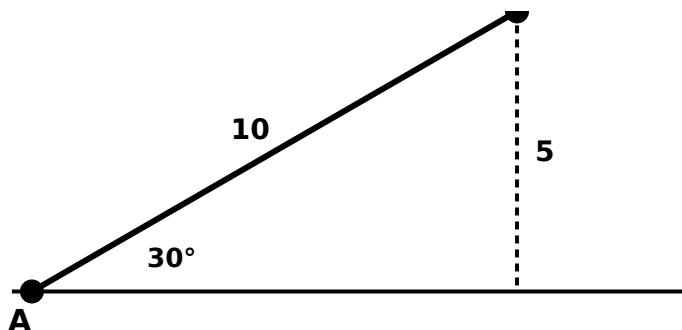


Triangle ABC.

- Find angle C. (1 point)
- Name the longest side and the shortest side. (1 point)
- Is this triangle unique? Explain. (1 point)

Question 6 Surveyor Problem (3 points)

In triangle ACB, angle A = 30° and AC = 10 in. The height of C above line AB is 5 in, as shown.



Angle A = 30° , AC = 10 in, and the height of C above line AB is 5 in.

How many different triangles ACB can be drawn if BC is:

- 4 in (1 point)
- 5 in (1 point)
- 8 in (1 point)

Question 7 Straw Triangle (3 points)

Two straws have lengths 7 in and 9 in. A third straw has length x in.

- Write the range of values of x that forms a triangle. (1 point)
- How many whole-number lengths of x work? (1 point)
- Explain why $x = 16$ does not work. (1 point)

Question 8 Find the Flaw (2 points)

Tara says, "Any three angles that add to 180° make exactly one triangle."

- a. Give two different triangles that have the same three angles. *(1 point)*
- b. Explain why Tara is wrong. *(1 point)*