

Building Triangles from Sides and Angles

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

Award points as marked. Accept any valid example in Question 8, and give the point for a conclusion only when it is supported by a sum, an angle comparison or the height comparison from the question.

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

Question 1 Triangle Inequality Tests (2 points)

- a. $8 + 11 = 19 > 18$, and the other sums are larger: **yes**.
- b. $9 + 12 = 21$, which is not greater than 21: **no**.

Scoring: 1 point per part, for the correct answer with the sum shown.

Question 2 Range of a Side (2 points)

The third side is less than $6 + 15 = 21$ and greater than $15 - 6 = 9$.

Greater than 9 in and less than 21 in

Scoring: 1 point for each bound.

Question 3 Third Angle (2 points)

$58 + 77 = 135$, and $180 - 135 = 45$. All angles (58° , 77° , 45°) are less than 90° .

45° ; acute

Scoring: 1 point for the angle, 1 point for the classification.

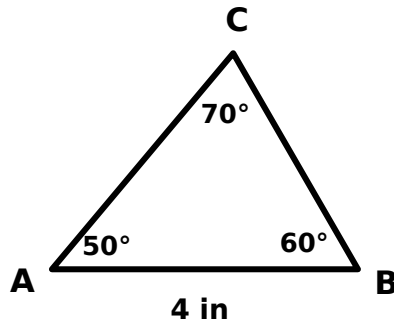
Question 4 Count the Triangles (3 points)

- a. $7 + 10 = 17 > 12$: **exactly one triangle** (SSS).
- b. No side is given, so **more than one triangle** (infinitely many).
- c. $3 + 5 = 8 < 9$: **no triangle**.

Scoring: 1 point per part.

Question 5 Triangle ABC (3 points)

- a. Angle C = $180 - 50 - 60 = 70^\circ$.
- b. The largest angle is C = 70° , opposite AB, so the **longest side is AB**. The smallest angle is A = 50° , opposite BC, so the **shortest side is BC**.
- c. Yes. Two angles and the side between them (ASA) give exactly one triangle.



Angle C = 70° is the largest, so AB is the longest side.

Scoring: 1 point per part.

Question 6 Surveyor Problem (3 points)

- a. $4 < 5$, so BC is shorter than the height: **no triangle**.
- b. 5 equals the height: **exactly one triangle** (a right angle at the foot).
- c. $5 < 8 < 10$, so BC lies between the height and AC: **two triangles**.

Scoring: 1 point per part.

Question 7 Straw Triangle (3 points)

- a. $9 - 7 < x < 9 + 7$, so **$2 < x < 16$** .
- b. The whole numbers 3 through 15: $15 - 3 + 1 = 13$.
- c. $7 + 9 = 16$, which is not greater than 16, so the straws lie flat.

Scoring: 1 point per part.

Question 8 Find the Flaw (2 points)

- a. For example, a triangle with angles 30° , 60° , 90° and short sides 3 in, 5.2 in, 6 in, and another with the same angles and sides twice as long.
- b. Angles fix the shape but not the size, so many triangles share the same three angles.

Scoring: 1 point per part.