

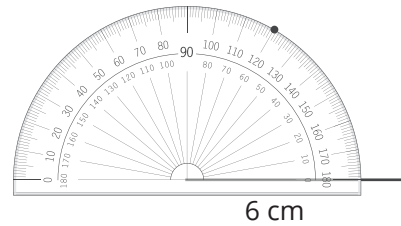
2 Constructing Triangles

Tools for Constructing Triangles

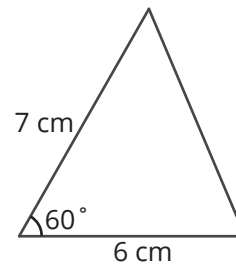
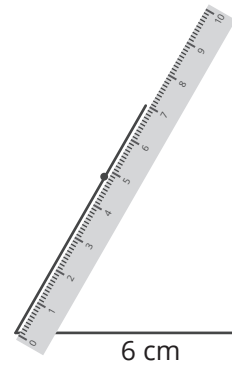
There are a variety of tools you can use to construct a triangle.

- Using a ruler to make certain side lengths and a protractor to make certain angles is a common way to draw triangles.

- Use a ruler to draw a line segment.
- Place the centre of the protractor on one end of the line segment, and line it up at 0° . Mark a dot at the desired angle.
- Use a ruler to connect the dot to the end of the line segment. Make this line the desired length.

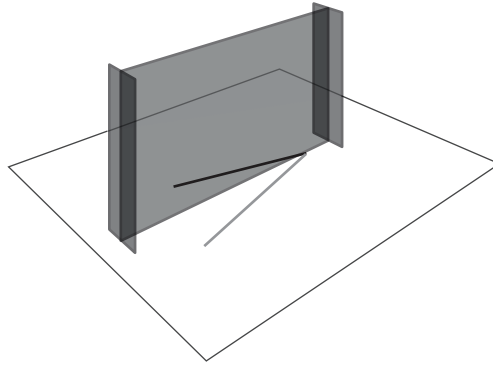


- Use a ruler to connect the ends of the two sides to make the third side.

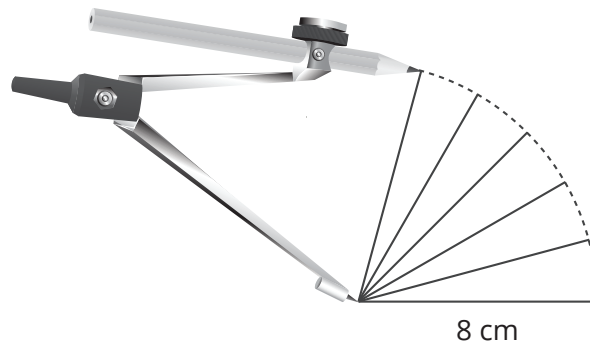


Tools for Constructing Triangles (continued)

- You can use a transparent mirror, such as a Mira, to create equal side lengths. You can use a ruler to draw the third side.



- You can use a compass to draw an arc that shows the possible positions of equal side lengths.



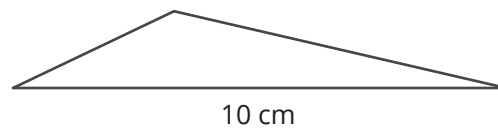
Any of these lines could be used to construct a triangle with two 8 cm side lengths.

Constructing Triangles With Given Side Lengths

If you know the side lengths of a triangle, you need a ruler to draw it.

- If you know only one side length, it's easy to draw a triangle.

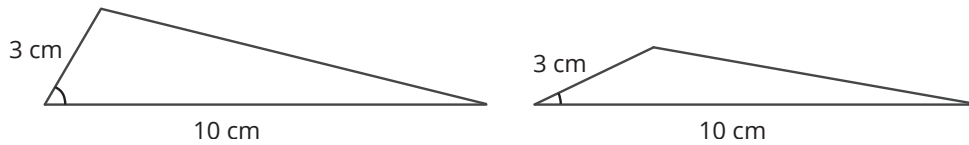
For example, to construct a triangle with a side length of 10 cm, you might draw the 10 cm side, and then draw two more sides. There are lots of possible triangles.



Constructing Triangles With Given Side Lengths (continued)

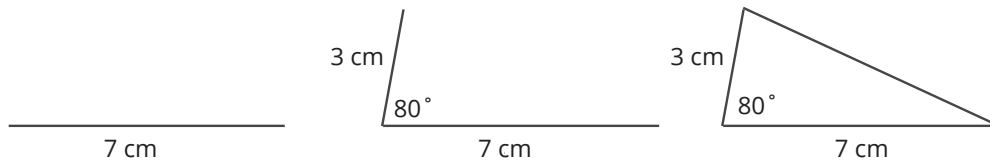
- If you know two side lengths, there are also lots of possible triangles.

For example, if a triangle has a side length of 10 cm and a side length of 3 cm, both of these angles are possible:



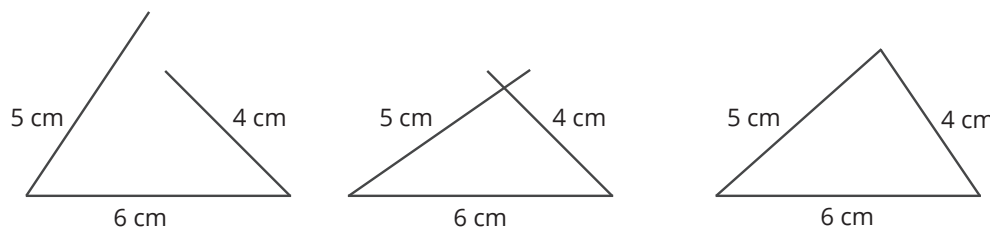
- If you know an angle between two side lengths, you might draw one side, then the angle, and then another side.

For example, if a triangle has side lengths of 7 cm and 3 cm and an angle of 80° between them, you might draw the triangle like this:

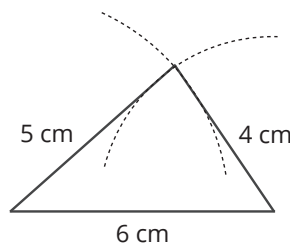


- If you know all three side lengths, you might have to experiment to make it work.

For example, if you know the sides are 4 cm, 5 cm, and 6 cm, you might draw the 6 cm side and then experiment with the positions of the other two sides.



A compass is helpful if you want to draw a triangle and you know all three side lengths. You can use a compass to make the possible lengths at both ends of the first line. Where the arcs overlap is where the vertex will be.

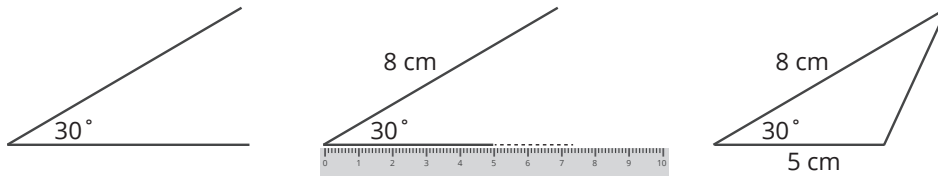


Constructing Triangles With Given Angles

If you know the angles of a triangle, you can use a protractor and a ruler to draw it.

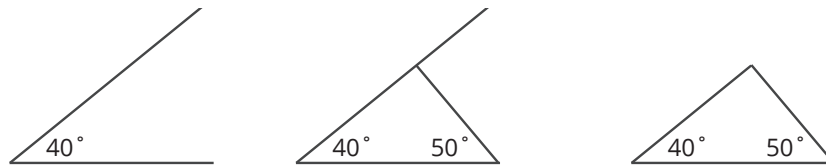
- If you know one angle of a triangle, you might simply draw it, and make sure that one or both of the arms are the side lengths you want.

For example, if a triangle has a 30° angle and side lengths of 5 cm and 8 cm, you might draw the triangle like this:



- If you know two angles of the triangle, you can draw one angle and then draw the other angle at the end of one of the arms of the first angle.

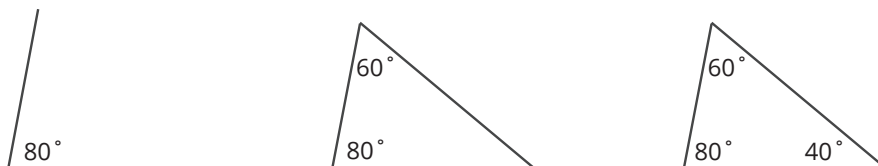
For example, if a triangle has an angle of 40° and an angle of 50° , you might draw the triangle like this:



Make sure all of your angles are **inside** the triangle.

- If you know all three angles of the triangle, you draw the first two angles and then the third angle should be automatic.

For example, if a triangle has angles of 80° , 60° , and 40° , you might draw the triangle like this:



Note that it is not possible to draw a triangle with angles of 40° , 80° , and 50° . The third angle must be 60° .

Definitions

compass: a tool used to draw circles and arcs

protractor: a tool for measuring angles in degrees (°)
