Constructing Shapes

Information

Common core icons

This icon indicates a slide where the Standards for Mathematical Practice are being developed. Details of these are given in the Notes field.

MODELING

Slides containing examples of mathematical modeling are marked with this stamp.

This icon indicates an opportunity for discussion or group work.

The **Standards for Mathematical Practice** outlined in the Common Core State Standards for Mathematics describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

These are:

1) **Make sense of problems and persevere in solving them.**

2) **Reason abstractly and quantitatively.**

3) **Construct viable arguments and critique the reasoning of others.**

4) **Model with mathematics.**

5) **Use appropriate tools strategically.**

6) **Attend to precision.**

7) **Look for and make use of structure.**

8) **Look for and express regularity in repeated reasoning.**

This icon indicates that the slide contains activities created in Flash. These activities are not editable.
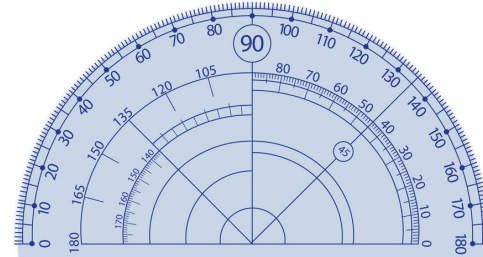
This icon indicates teacher's notes in the Notes field.

What equipment do you think we need for constructions?
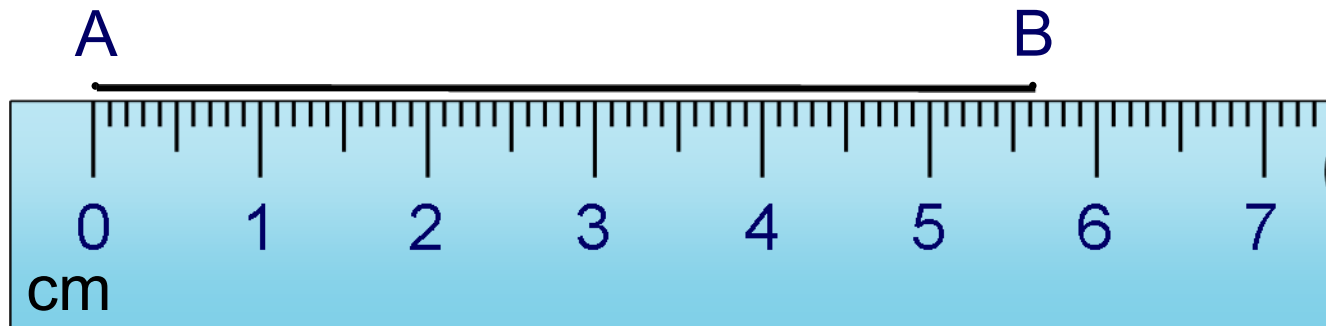
A ruler

A protractor

A compass

A *sharp* pencil

To draw a line segment, use a ruler and pencil.

Draw a line segment, AB, of length 56 mm:

- Draw a point and label it A.

- Place your ruler with 0 mm at point A.

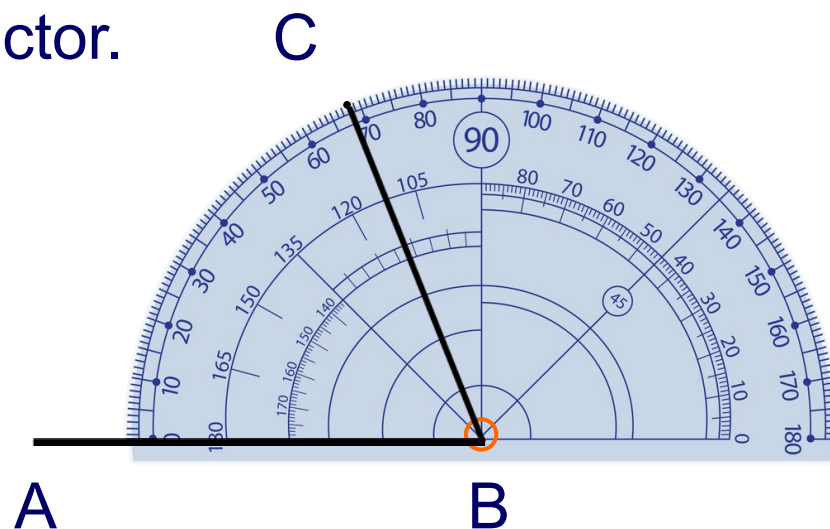- Mark point B at 56 mm.

- Draw line segment AB.

Constructing angles

To draw a given angle, use a ruler, a protractor and a pencil.

Construct ∠ABC = 68°.

- Start by drawing line segment AB.

- Place a protractor so that point B is at the center point of the protractor.

- Reading the scale so that 0° is on AB, mark point C at 68°.

- Use a ruler to draw a line from point B to point C.

To draw a **reflex angle**, we can use a 360° protractor, or we can use a 180° protractor by subtracting the angle from 360°.
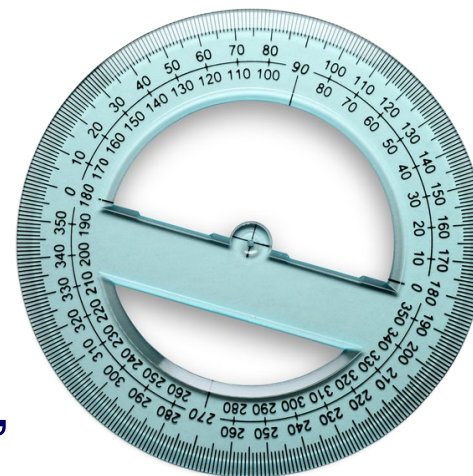
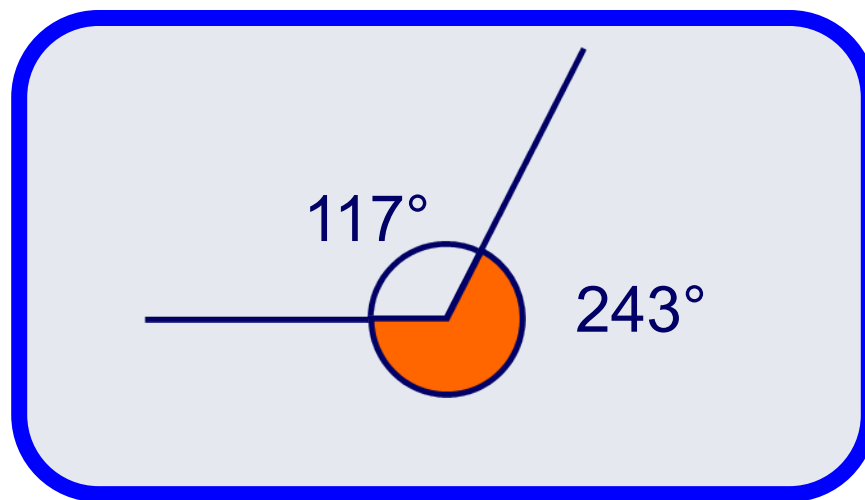For example, to draw an angle of 243°, find 360° – 243°.

360° – 243° = 117°.

Draw an angle of 117°.

The reflex angle will be the required 243°.

117°

243°

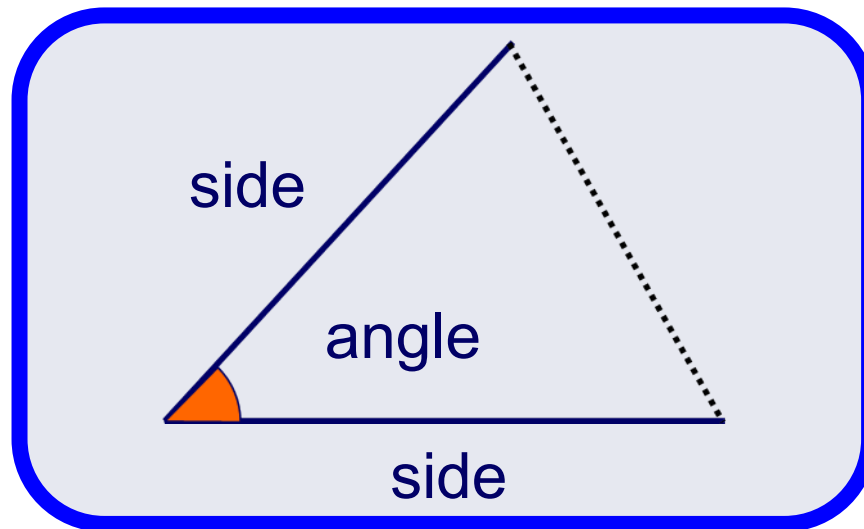Use the ruler and protrator tools provided to draw the following lines and angles as accurately as possible.

Press **start** to begin.

start

How could we construct a triangle given the lengths of two of its sides and the angle between them?

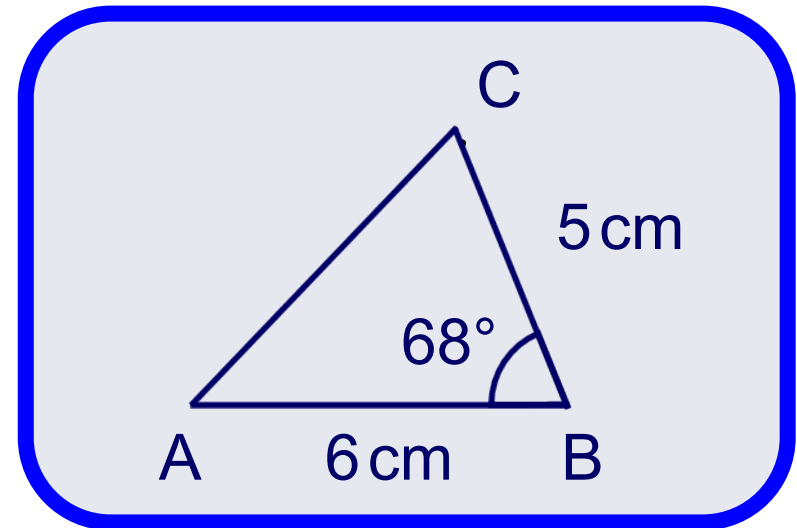The angle between the two sides is often called the **included angle**.

We use the abbreviation **SAS** to stand for **S**ide, **A**ngle and **S**ide.
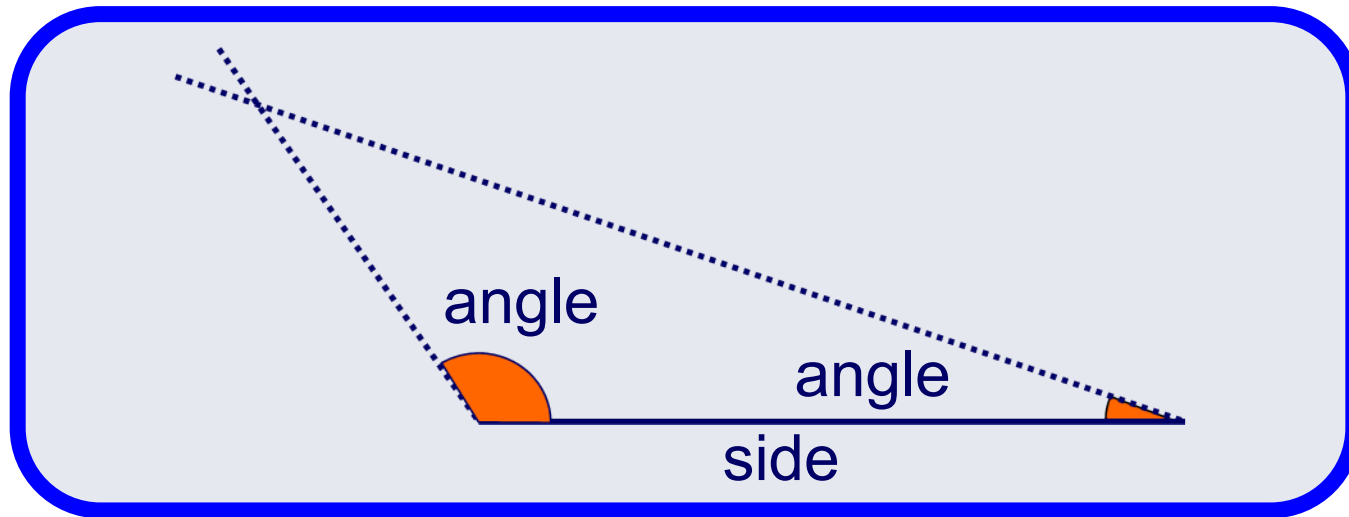
Construct $\triangle$ ABC with AB = 6 cm, $\angle$ B = 68° and BC = 5 cm.

- Start by drawing side AB with a ruler.

- Use a protractor to mark a 68° angle from point B.

- Use a ruler to draw a 5 cm line from B to C.

- Join A to C using a ruler to complete the triangle.

How could we construct a triangle given two angles and the length of the side between them?

angle

angle

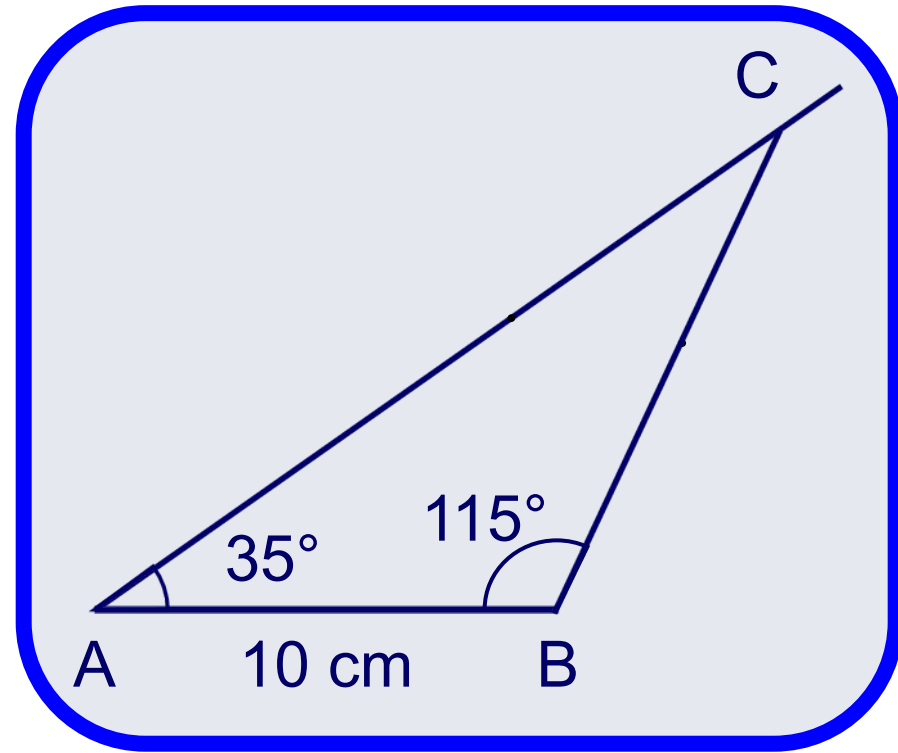side

The side between the two angles is often called the **included side**.

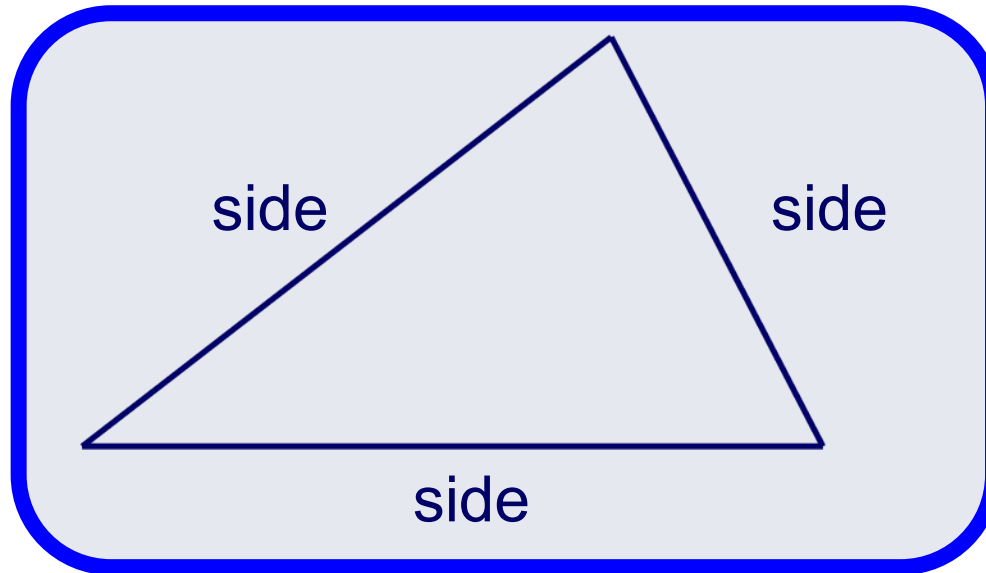We use the abbreviation **ASA** to stand for **A**ngle, **S**ide and **A**ngle.

For example, construct $\triangle$ABC with AB = 10 cm, $\angle$A = 35° and $\angle$B = 115°.

- Start by drawing side AB with a ruler.

- Use a protractor to mark a 35° angle from point A.

- Use a ruler to draw a long line from A.

- Use a protractor to mark a 115° angle from point B.

- Use a ruler to draw a line from B to meet the other line at point C.

How could we construct a triangle given the lengths of three sides?

side

side

side

Hint: We would need to use a compass.

We use the abbreviation **SSS** to stand for **S**ide, **S**ide, **S**ide.

Construct △ ABC with AB = 4 cm, BC = 3 cm and AC = 5 cm.

- Start by drawing side AB with a ruler.

- Open a compass to a length of 5 cm.

- Put the compass needle at point A and draw an arc above line AB.

- Next, open the compass out to a length of 3 cm.

- Put the compass needle at point B and draw an arc crossing over the other one. The lines meet at point C.

- Draw lines AC and BC to complete the triangle.
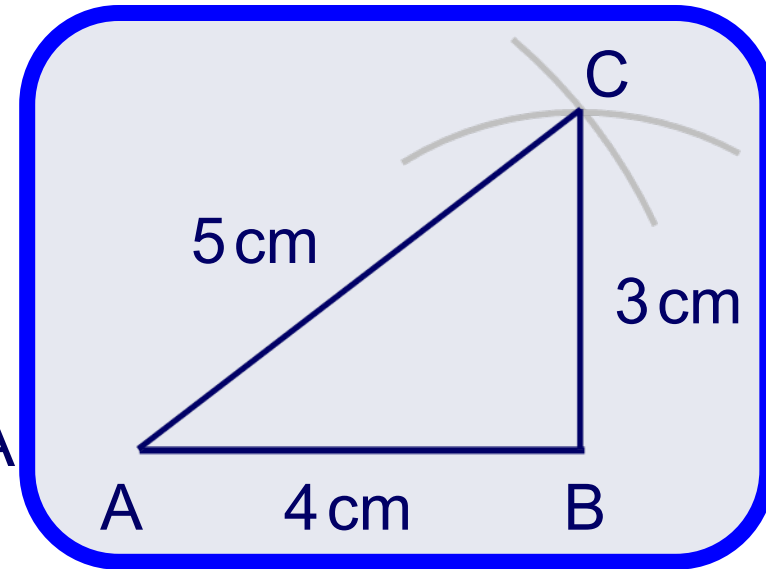
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Drawing conclusions

Constructing triangles

Decide whether the conditions create a unique triangle, multiple triangles or no triangle.

$$AB = 6\,cm \qquad A = 25° \qquad BC = 7\,cm$$

unique triangle

multiple triangles

no triangle