4 - 1   Angles   Size of Angles and Angles of a Set Square
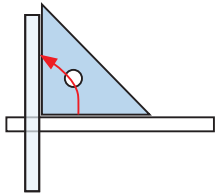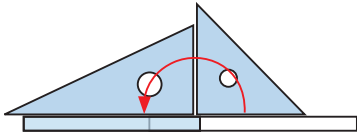
Example 1   Look at the angles below. How many right angles are there?

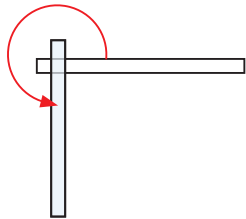The angle has ⌐ 1 ⌐ right angle.

1   Look at the angles below. How many right angles are there?

1

Angle **1** has ▢ right angles.

2

Angle **2** has ▢ right angles.

Instruction **1** Unit to express the size of angles.

- The size of an angle is determined by the amount of space between the sides and not the lengths of the sides.
  side / angle / side
- **Degree** is a unit to express the size of angles. One angle revolution has 360 equal parts. The size of one part is one degree and is written as $1°$
- 1 right angle equals to $90°$ and 4 right angles equal to $360°$

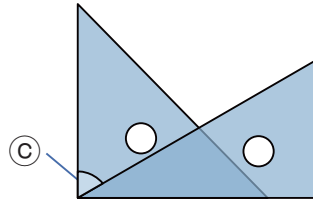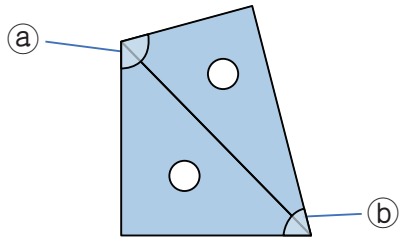A **protractor** is a tool to measure the size of angles

one degree
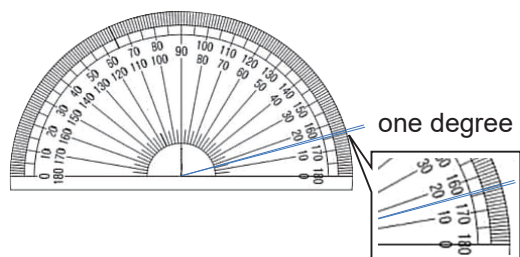
Instruction Measure the size of the angles on a set square using a protractor.

45°
45°
90°

60°
30°
90°

44
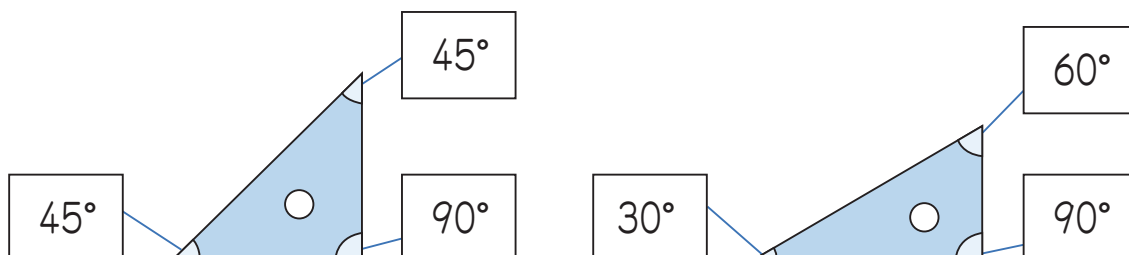
Example Two different set squares are used to make angles as follows. Find the size of each marked angles.

Angle a is $\boxed{105°}$

Angle b is $\boxed{75°}$
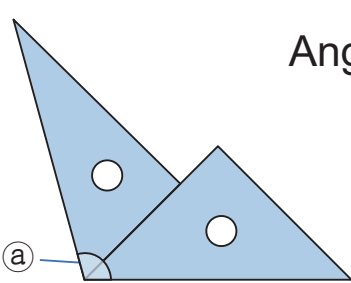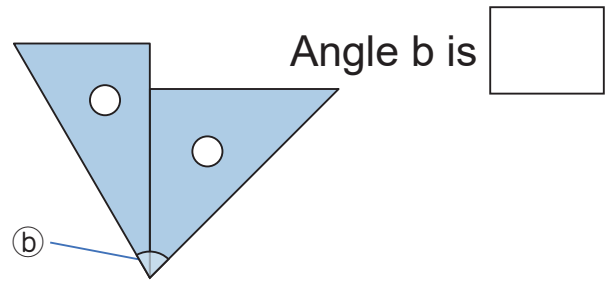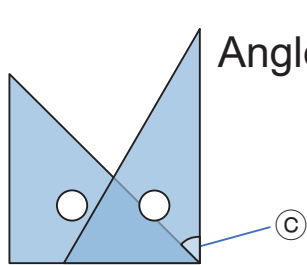
Angle c is $\boxed{60°}$

Two different set squares are used to make the following angles. Find the size of each marked angle.

Angle a is $\boxed{}$
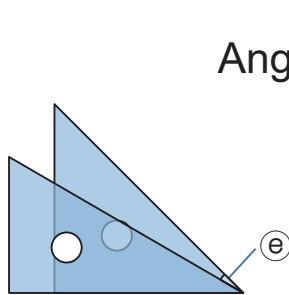
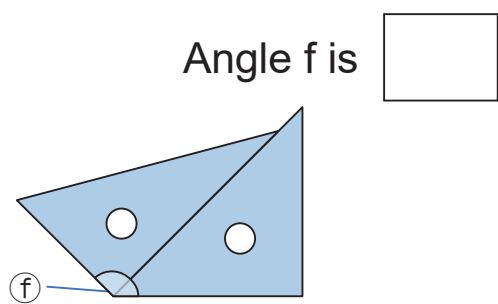Angle b is $\boxed{}$

Angle c is $\boxed{}$
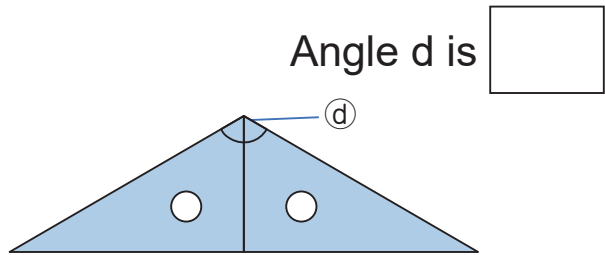
Angle d is $\boxed{}$

Angle e is $\boxed{}$

Angle f is $\boxed{}$
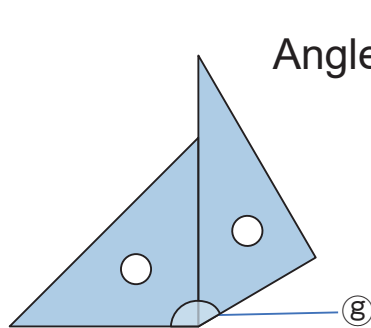
Angle g is $\boxed{}$

You can make various angles with set squares. Do you have any findings?

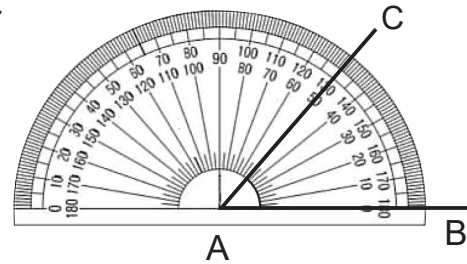You can make 30°, 45°, 60°, 75°, 90°, 105°…
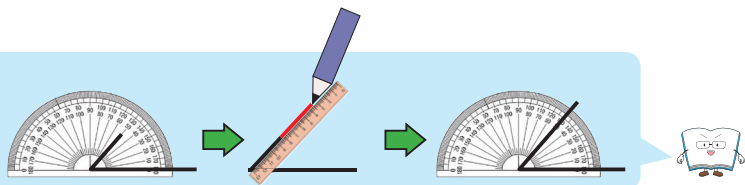
45

4 - 2 Angles

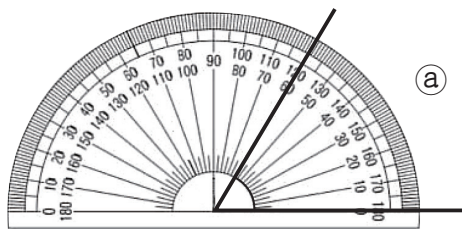## How to Measure Angles

Instruction How to use a protractor.

① Put the center of the protractor over vertex A of the angle.

② Put the 0° line over side AB of the angle
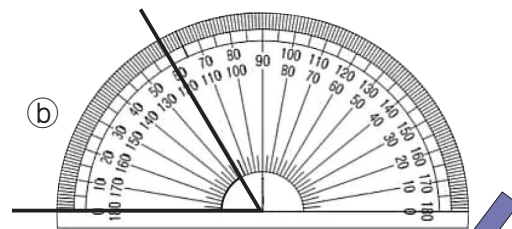
③ Read the scale mark that overlaps side AC

When line is too short to measure with a protractor, extend the line.

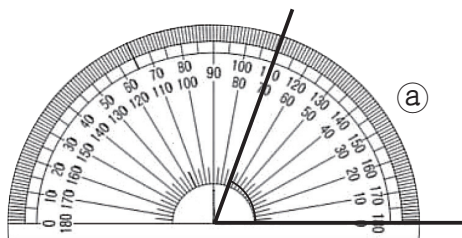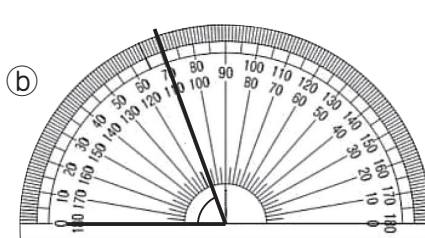**Example 1** Measure the following angles with a protractor.

ⓐ

Angle a is | 60°

ⓑ

Angle b is | 60°

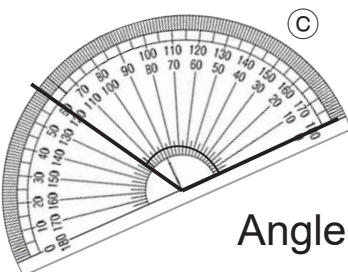**1** Measure the following angles with a protractor.

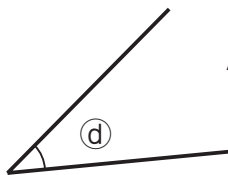Wrong way to measure

ⓐ

Angle a is
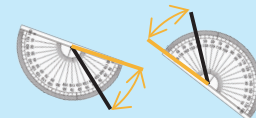
ⓑ

Angle b is

ⓒ

Angle c is

Angle d is

ⓓ

Put the 0° line over side of the angle.

Angle e is ☐

Angle f is ☐

Angle g is ☐

Example 2   Measure the following angles with a protractor.

How can we measure the angle?

Angle is | 225° |

1. Measure the size of angle smaller it is than 180°.	2. Subtract the angle from 360°.
	$360 - 135 = 225$

Alternatively, you can measure by adding $180° + 45° = 225°$

2   Measure the following angles with a protractor.

It is easier to find the angle by subtracting the small angle from 360°.
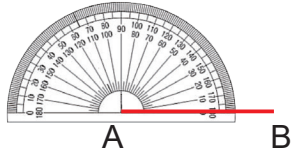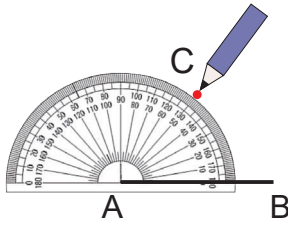
ⓐ

ⓑ

Angle a is ☐

Angle b is ☐

47

4 - 3　How to Draw Angles

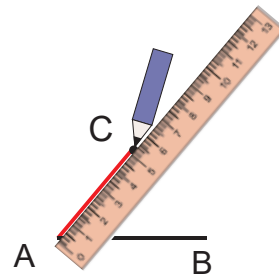**Instruction**　Let's draw a 50° angle using a protractor.

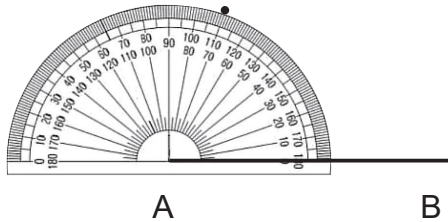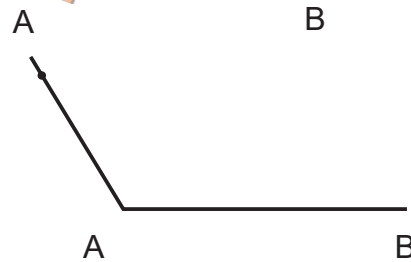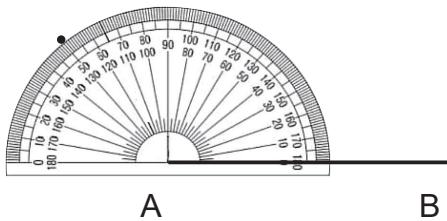| 1. Draw a straight line between points A and B. Place the center of the protractor at point A and match side AB to the 0° line.	2. Draw a point C at the 50° scale mark.	3. Connect points A and C by drawing a straight line.

Example　Draw the following angles using point A as the vertex.

① 70°

② 120°

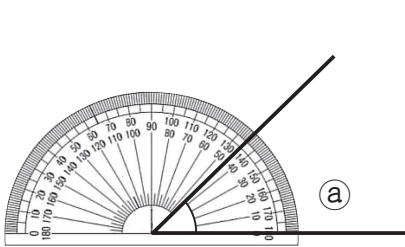Draw the following angles using point A as the vertex.

① 45°

② 20°

③ 150°

④ 135°
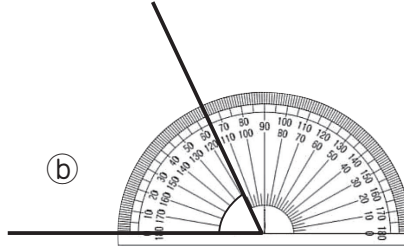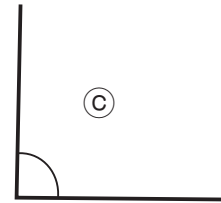
4 – 4 Angles

Review

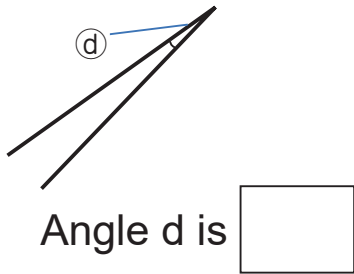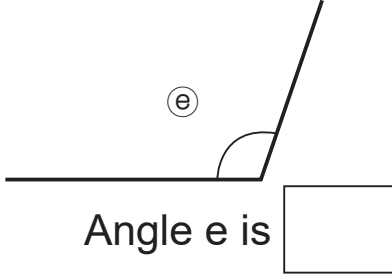**1** Measure the following angles with a protractor.
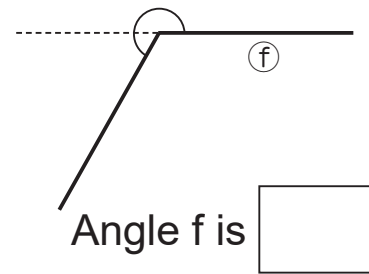
ⓐ

Angle a is ☐

ⓑ

Angle b is ☐
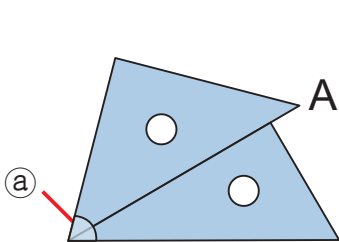
ⓒ

Angle c is ☐

ⓓ

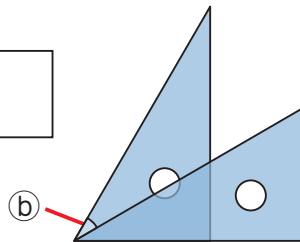Angle d is ☐

ⓔ

Angle e is ☐

ⓕ

Angle f is ☐

2 Two different set squares are used to make angles as follows. Find the size of each marked angle.

ⓐ

Angle a is ☐

ⓑ

Angle a is ☐

3 Draw the following angles using point A as the vertex.

1 60°

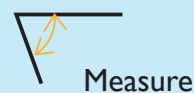A ──────── B

2 157°

A ──────── B

3 270°

A ──────── B

We can measure an angle larger than 180° by subtracting the angle from 360°.

Subtracting from 360°

Measure

49