

Using drawing tools & applied geometry





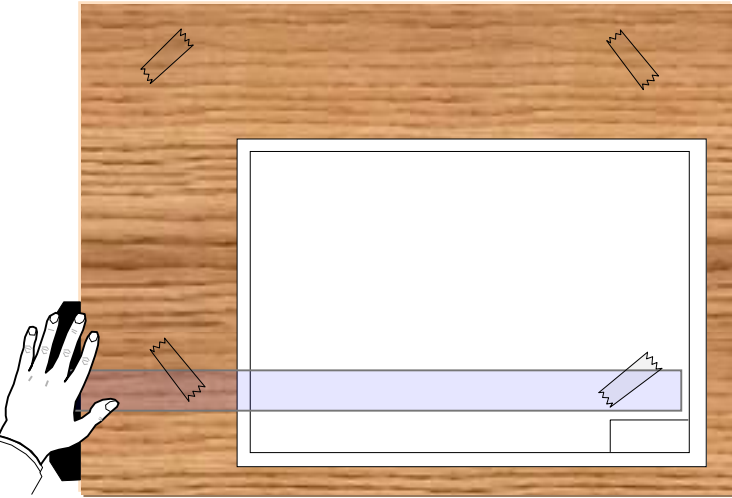
Preparation of Tools

Contents

Tools to be prepared

- 1. Paper** Fastening a sheet to a drafting board
- 2. Pencils** Sharpening the lead
- 3. Compass** Sharpening the lead

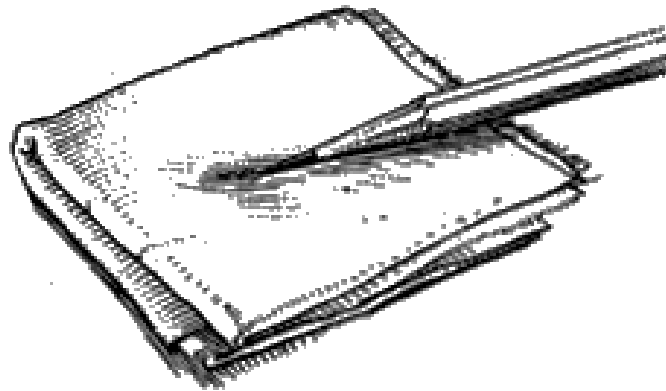
Paper



1. Place a paper close to the left edge of a table where a drafter can work conveniently.
2. Place a T-square.
3. Move the paper until its lower edge lies close to the top edge of a T-square.
4. Align the top edge of the paper with T-square blade.
5. Attach the paper's corners with tape.
6. Move T-square down to smooth the paper.
7. Attach the remaining paper's corners with tape.

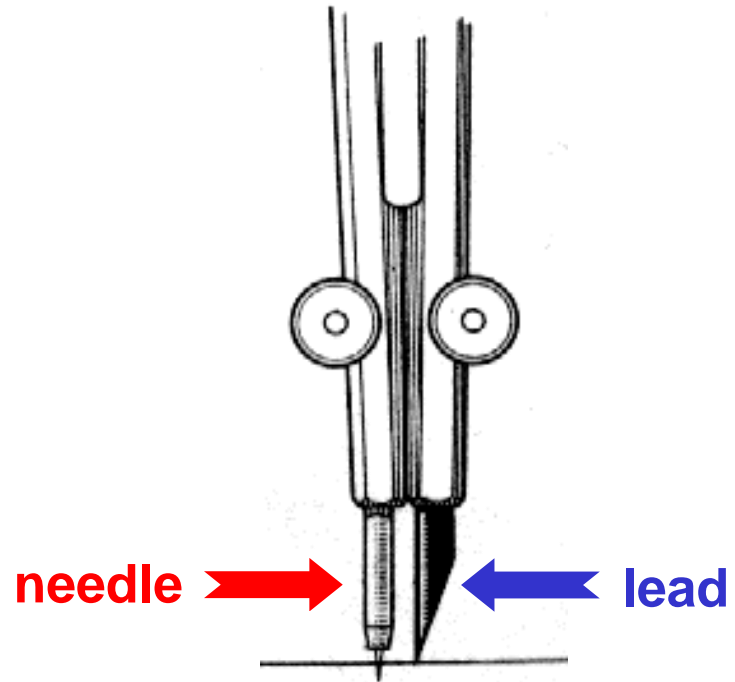
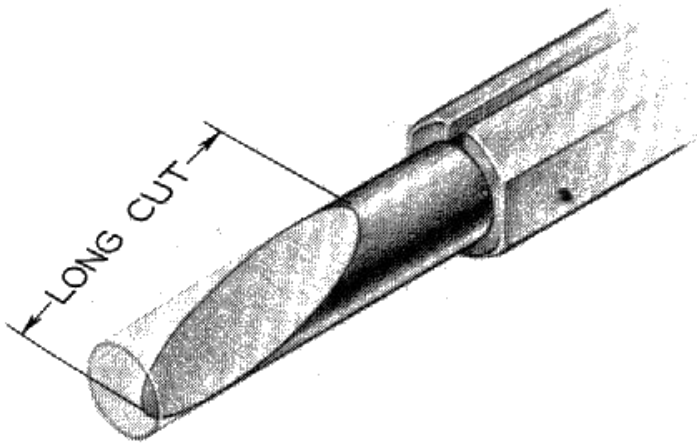
Pencil

1. Remove the wood with penknife while expose a lead about 8-10 mm.
2. Polish the lead into a conical shape with a sandpaper.
3. Clean the lead with tissue paper.



Compass

1. Sharpen the lead with a sandpaper.
2. Adjust the **needle** and the **lead** so that the tip of the needle extends slightly more than the lead.





Using the Tools

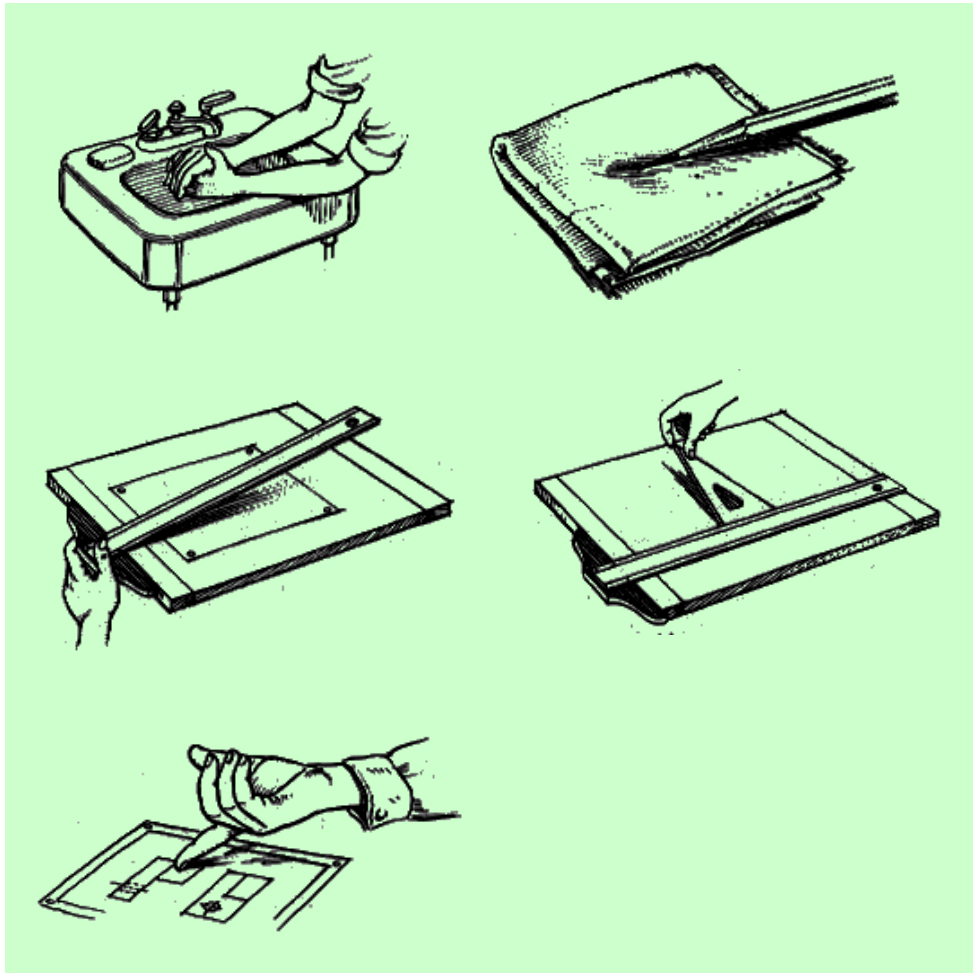
[Contents](#)

Function of the tools

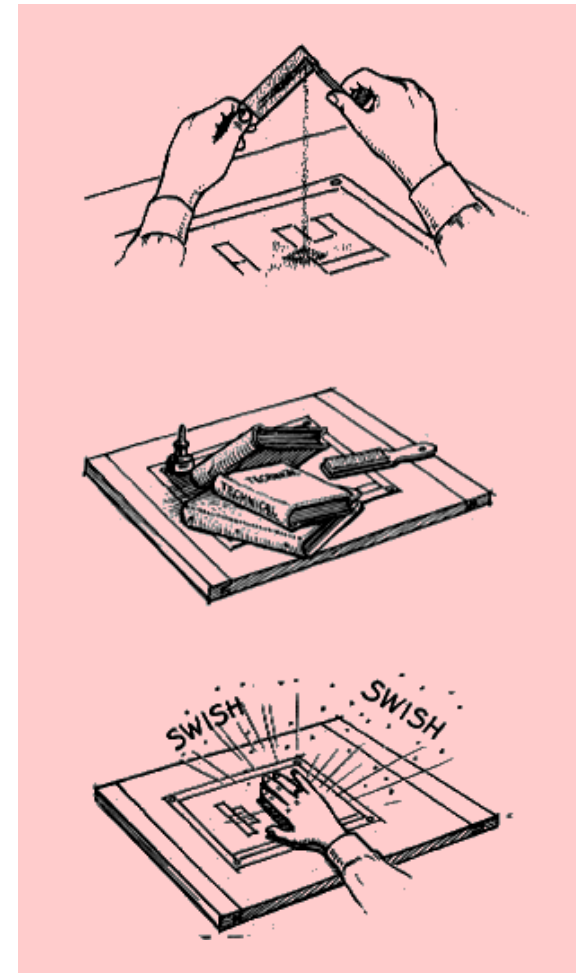
Tools	Shape to be drawn
1. T-square	Straight line
2. Triangles	
T-square and triangles can be used together to draw an inclined line with 15° increment, i.e. 15°, 30°, 45°, 60°, 75°, 90°, 105°, 120°, 135°, 150°, 165°, 180° etc.	
3. Compass	Arc, Circle
4. Circle template	

To keep your drawing clean

Do



Don't



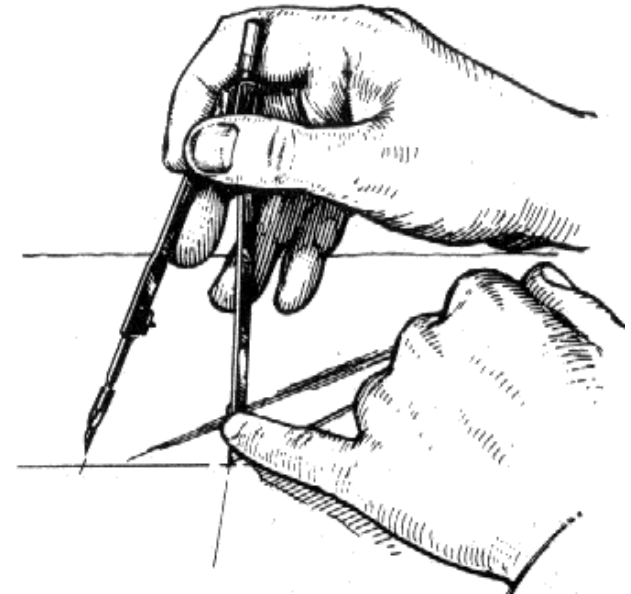
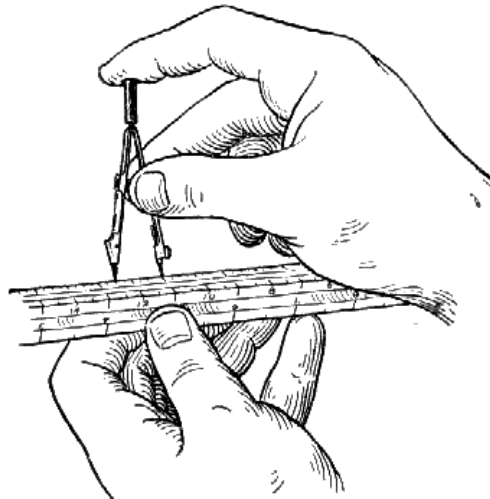
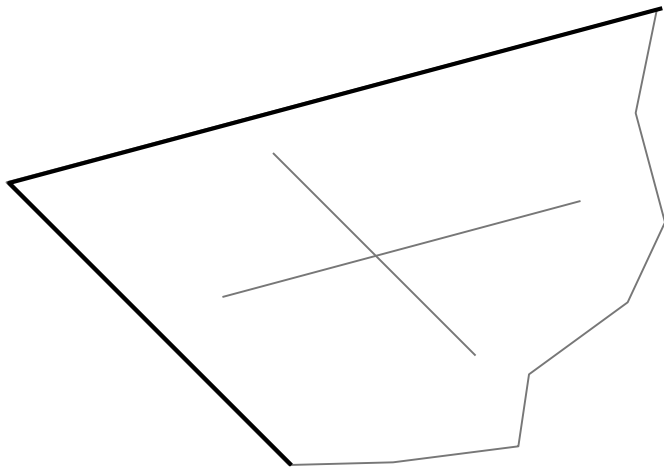
Using a compass

1. **Locate the center of the circle to be drawn.**

Draw two intersecting lines.

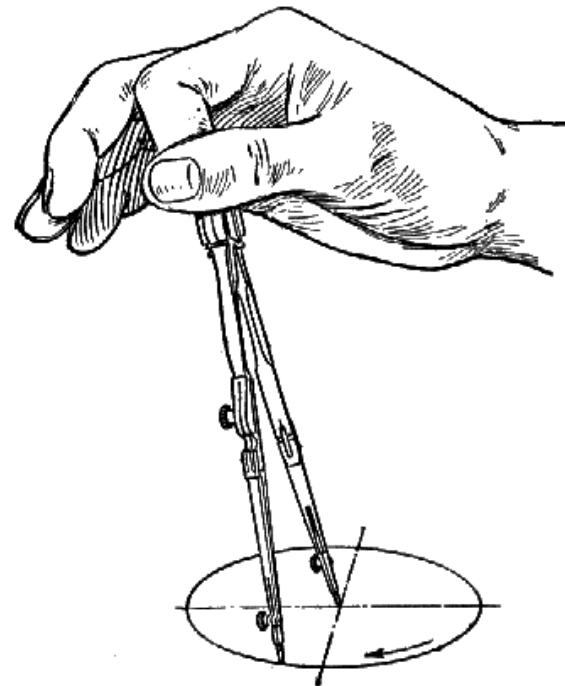
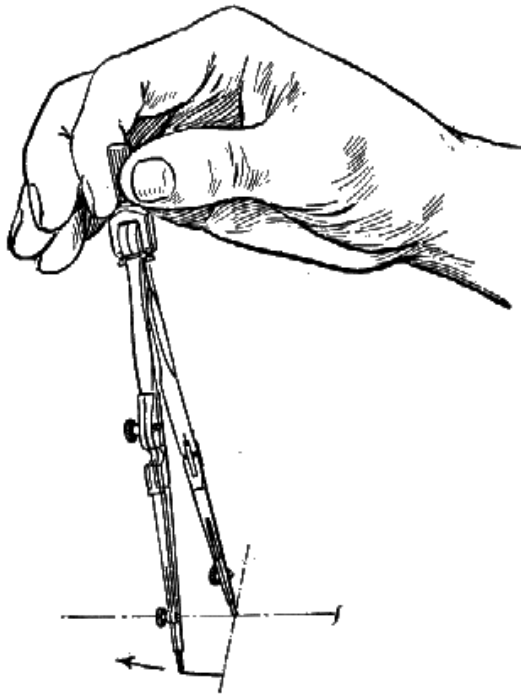
2. Adjust the distance between a needle and a lead to be a radius of the circle.

3. Set the needle point at the circle's center.



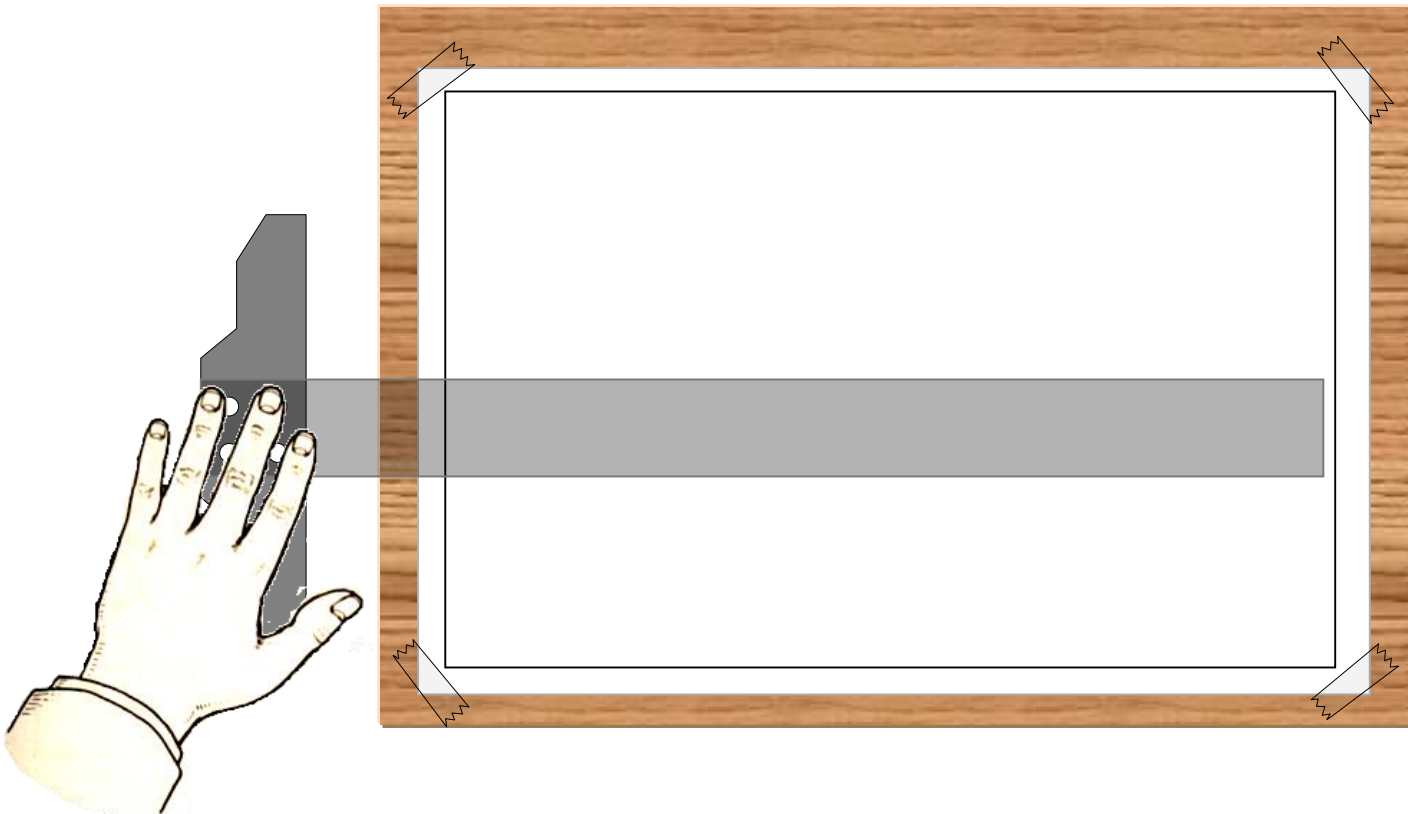
Using a compass

4. **Start circle.** Apply enough pressure to the needle, holding the compass handle between thumb and index fingers.
5. **Complete circle.** Revolve the handle clockwise.



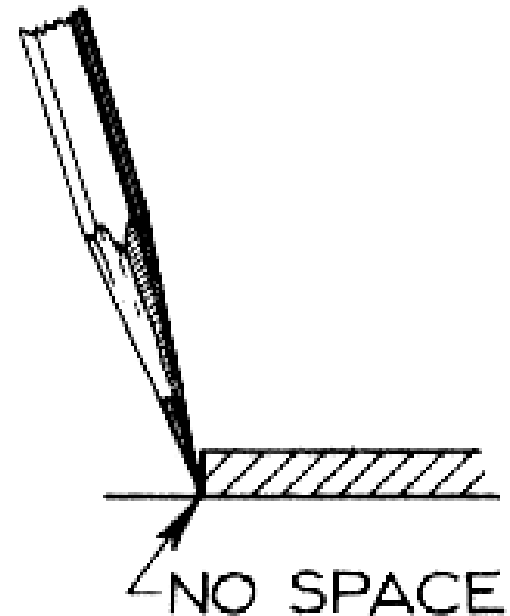
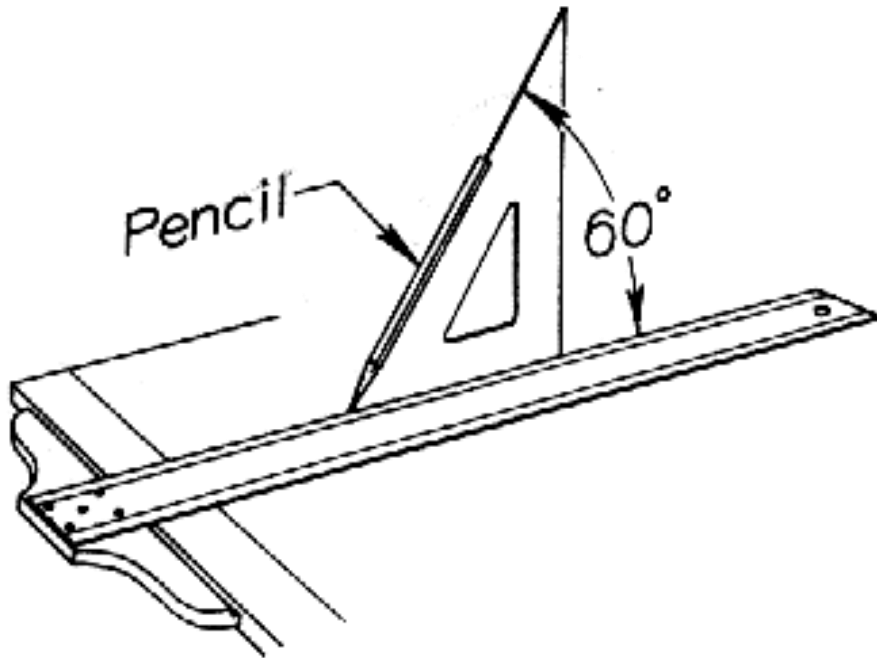
Draw a horizontal line

1. Press the T-square head against the left edge of the table.
2. Smooth the blade to the right.



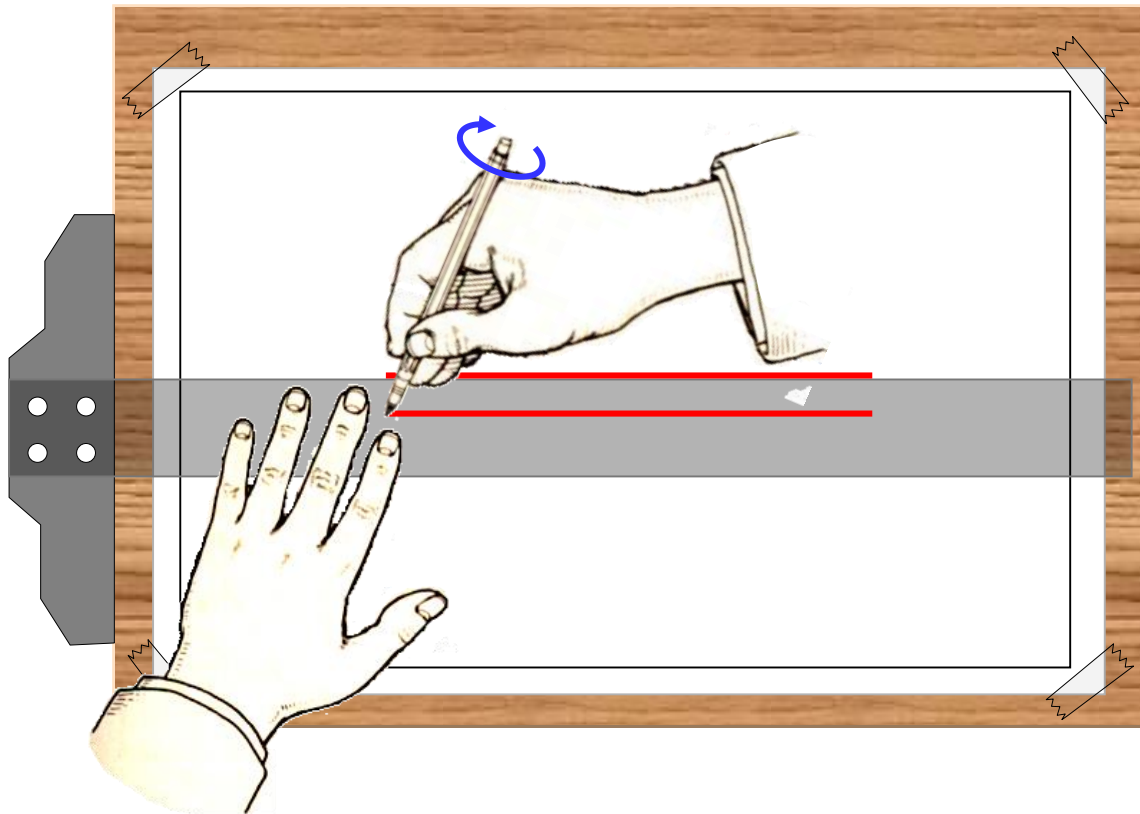
Draw a horizontal line

3. Lean the pencil at an angle about 60° with the paper in the direction of the line and slightly “toed in”.
4. **Rotate the pencil slowly** while moving the pencil from left to right.



Draw a horizontal line

5. Move T-square up or down to draw another horizontal line.

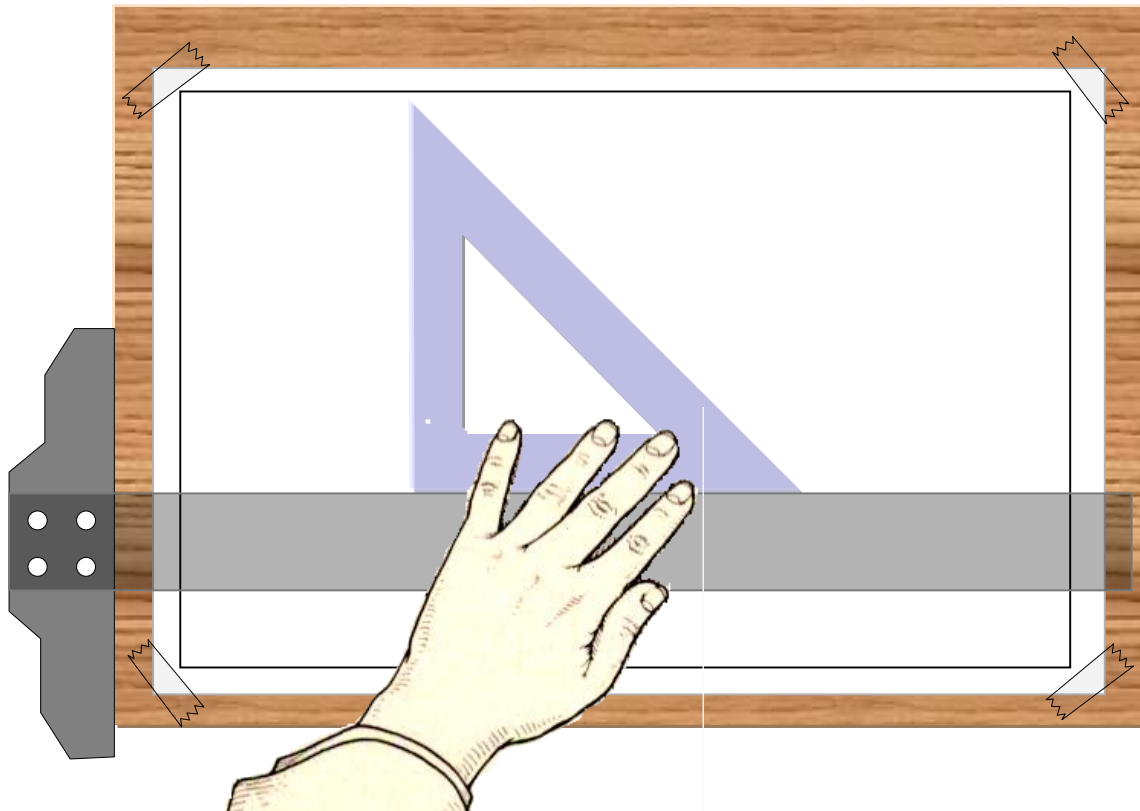


Draw a vertical line

1. Set T-square as before.

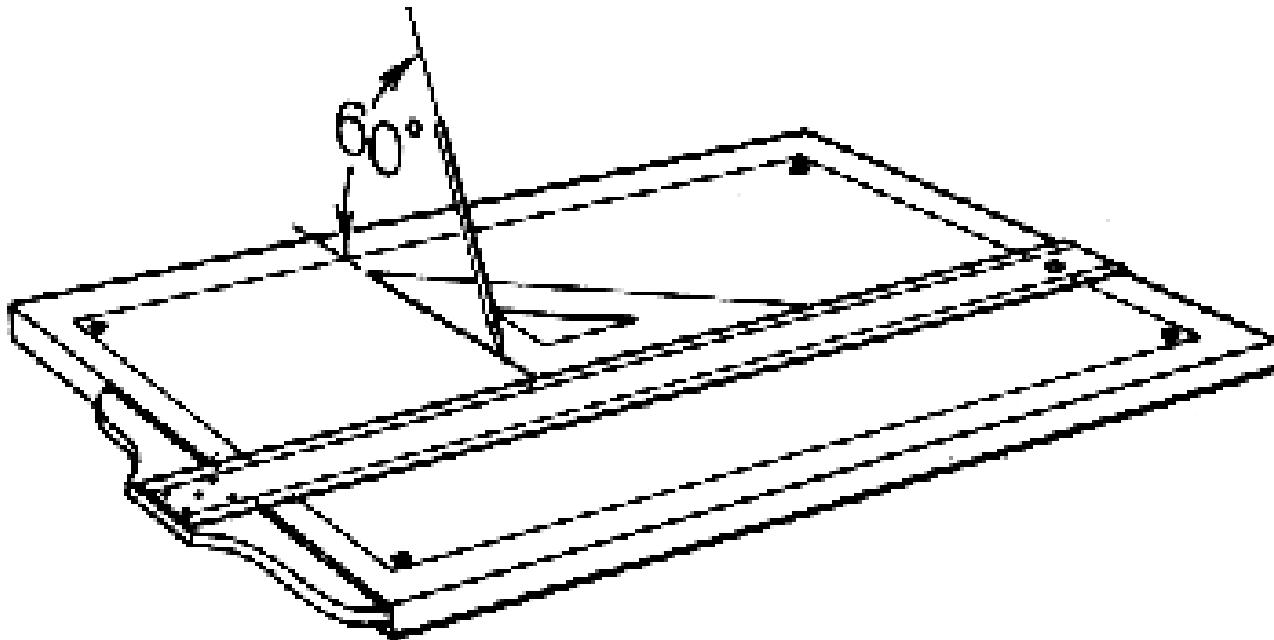
Place any triangle on T-square edge.

2. Use your left hand to hold both T-square and triangle in position.



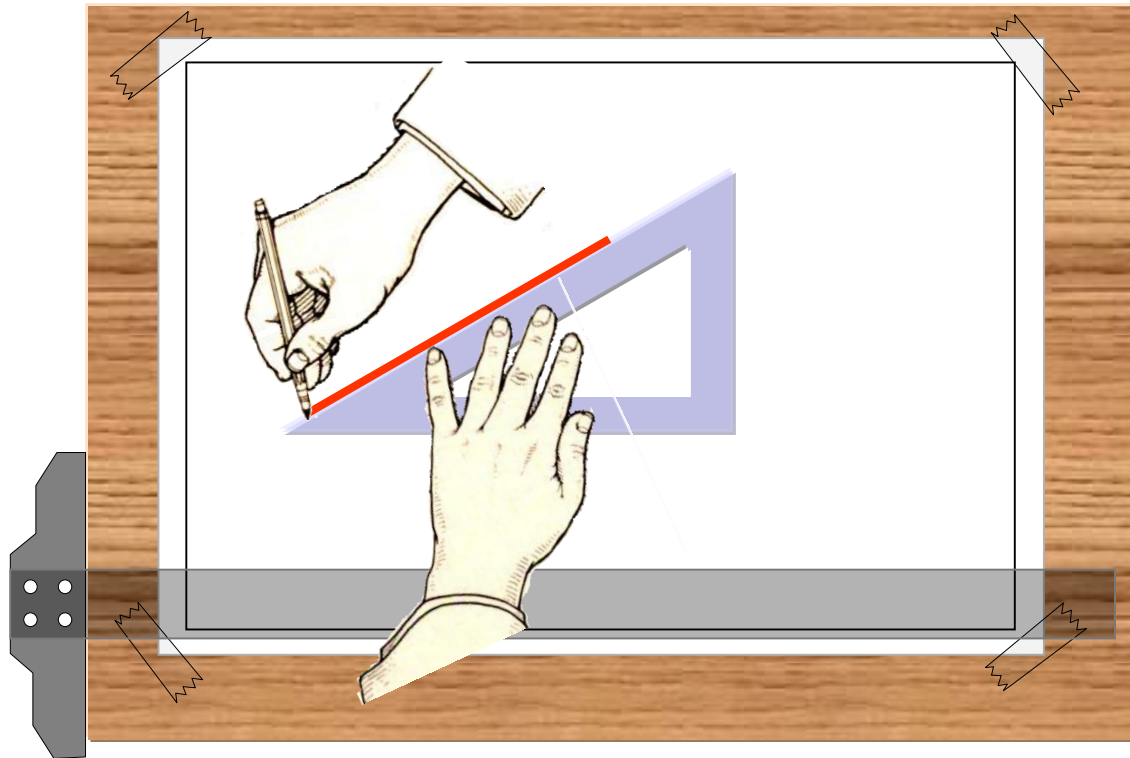
Draw a vertical line

3. Lean the pencil to the triangle.
4. Draw the line upward while **rotating the pencil slowly**.



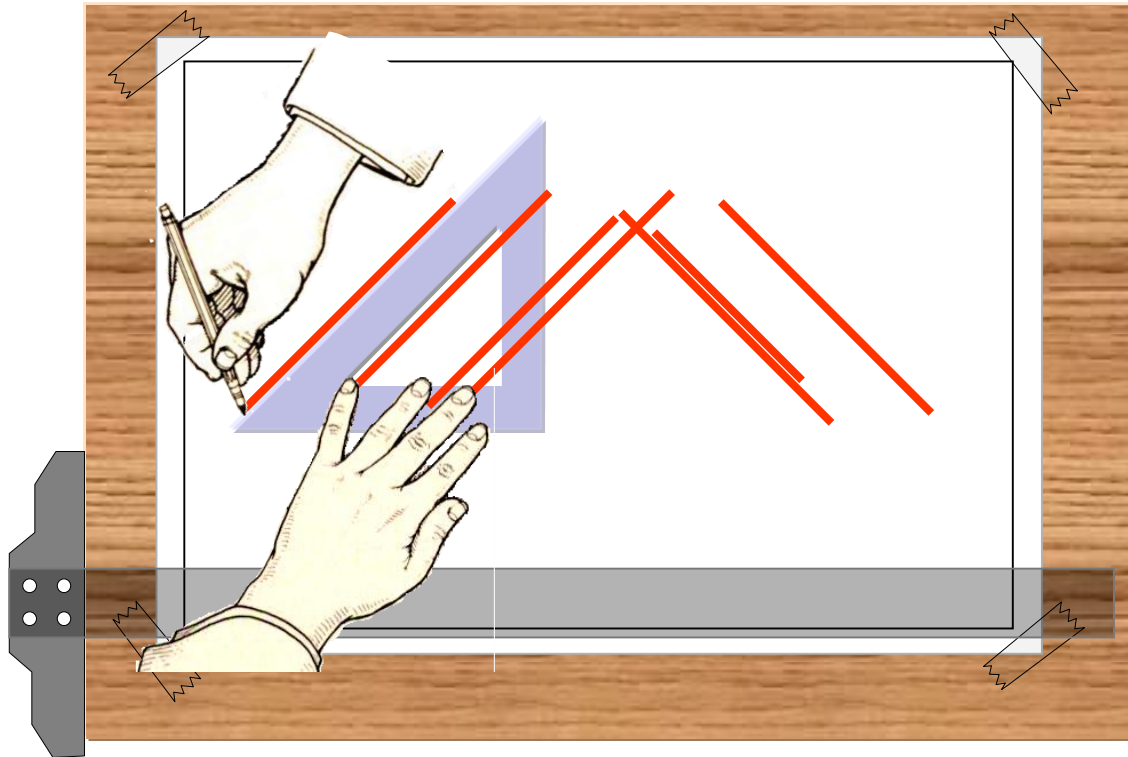
Draw a line at 30° with horizontal

1. Place 30°-60° triangle on the T-square edge and press them firmly against the paper.
2. Draw the line in the direction as shown below.



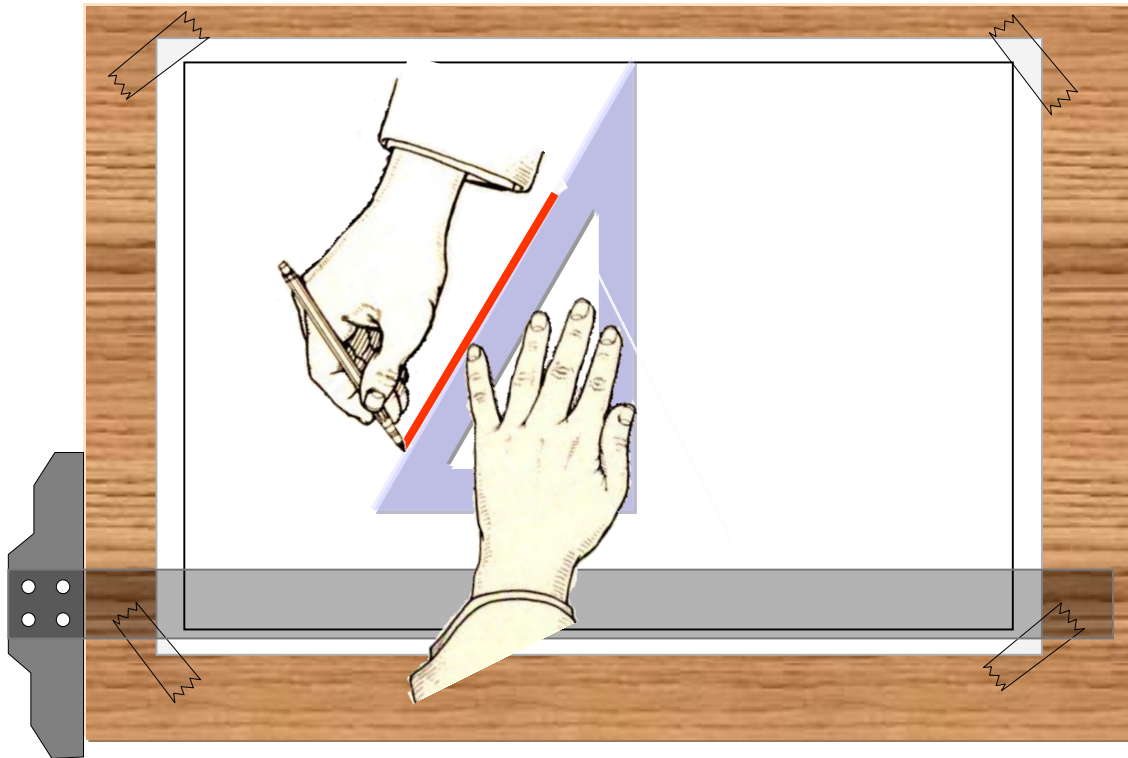
Draw a line at 45° with horizontal

1. Place 45° triangle on the T-square edge and press them firmly against the paper.
2. Draw the line in the direction as shown below.



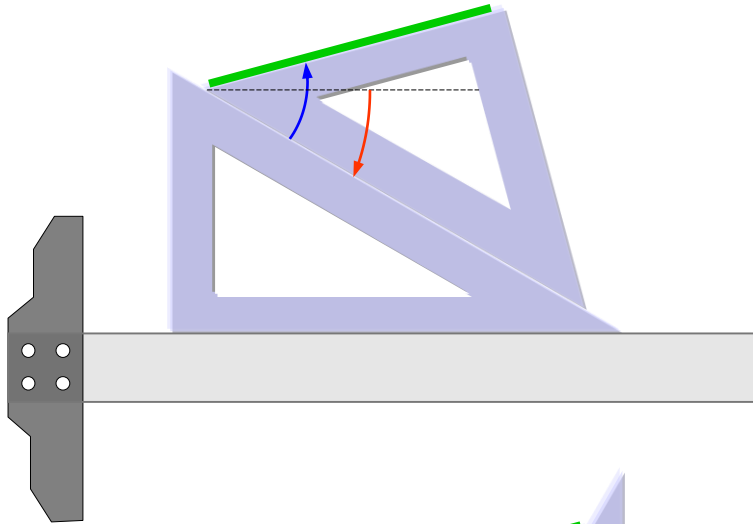
Draw a line at 60° with horizontal

1. Place 30°-60° triangle on the T-square edge and press them firmly against the paper.
2. Draw the line in the direction as shown below.



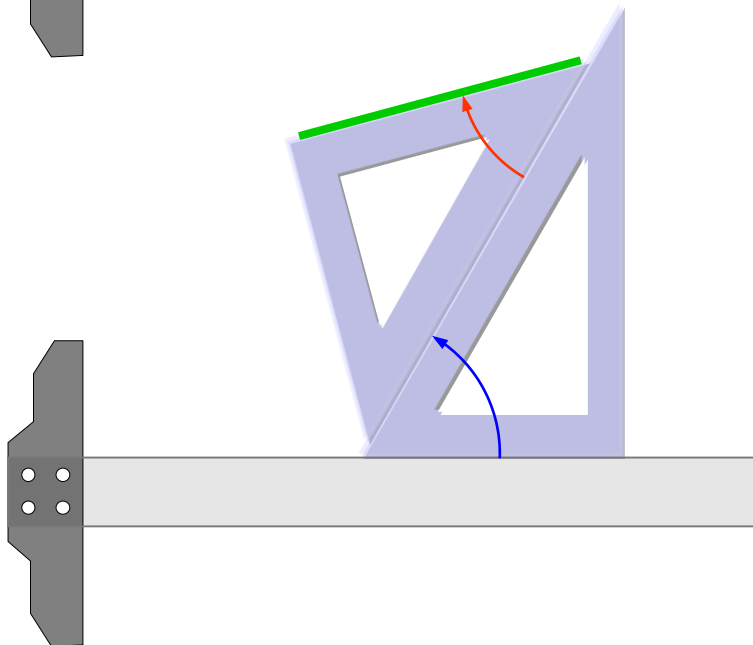
Draw a line at 15° with horizontal

1



$$-30^\circ + 45^\circ = 15^\circ \text{ CCW}$$

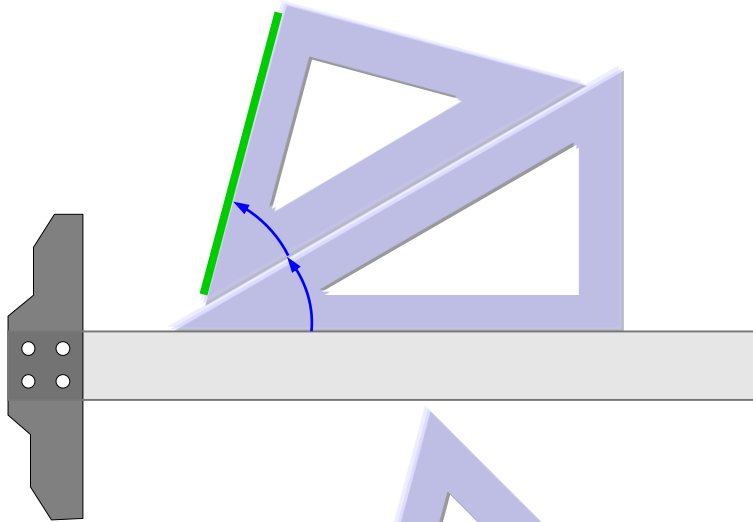
2



$$60^\circ + (-45^\circ) = 15^\circ \text{ CCW}$$

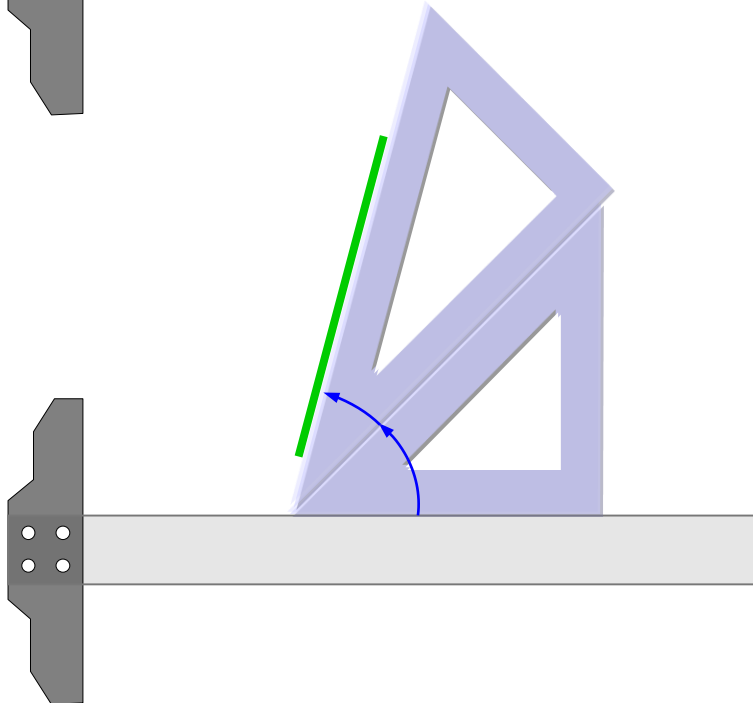
Draw a line at 75° with horizontal

1



$$30^\circ + 45^\circ = 75^\circ \text{ CCW}$$

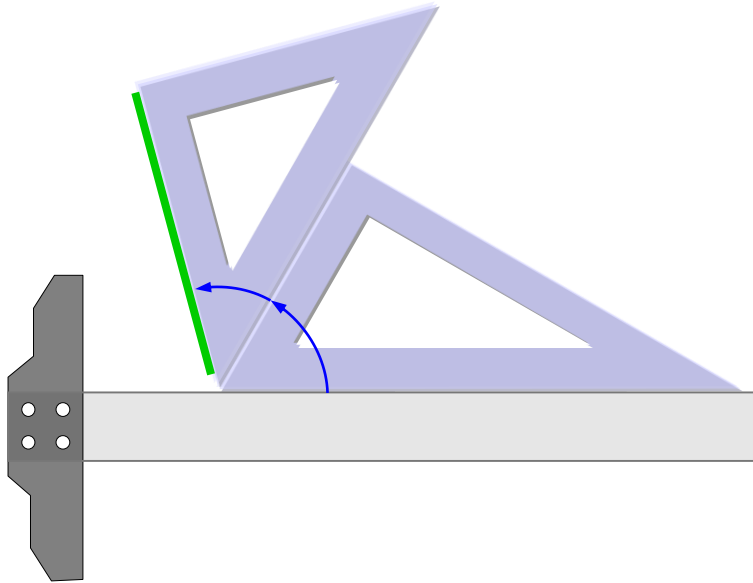
2



$$45^\circ + 30^\circ = 75^\circ \text{ CCW}$$

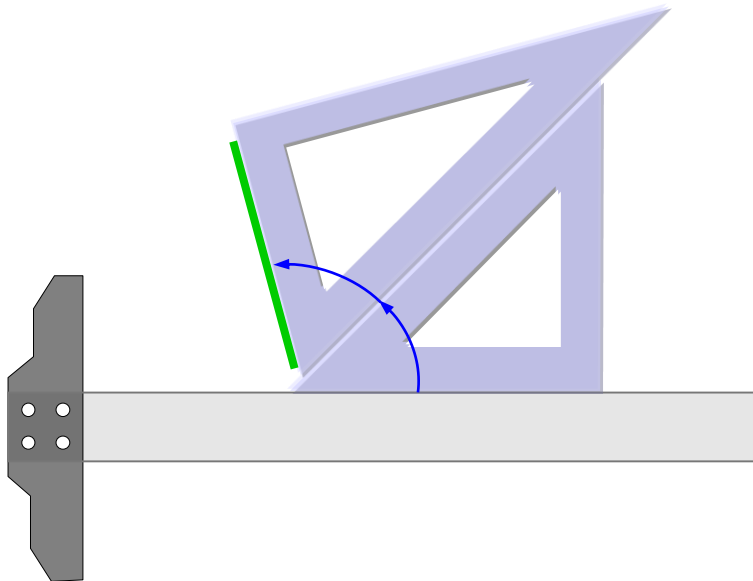
Draw a line at 105° with horizontal

1



$$60^\circ + 45^\circ = 105^\circ \text{ CCW}$$

2



$$45^\circ + 60^\circ = 105^\circ \text{ CCW}$$

planning of paper

