ENGINEERING DRAWING
SKV 1021

GEOMETRY

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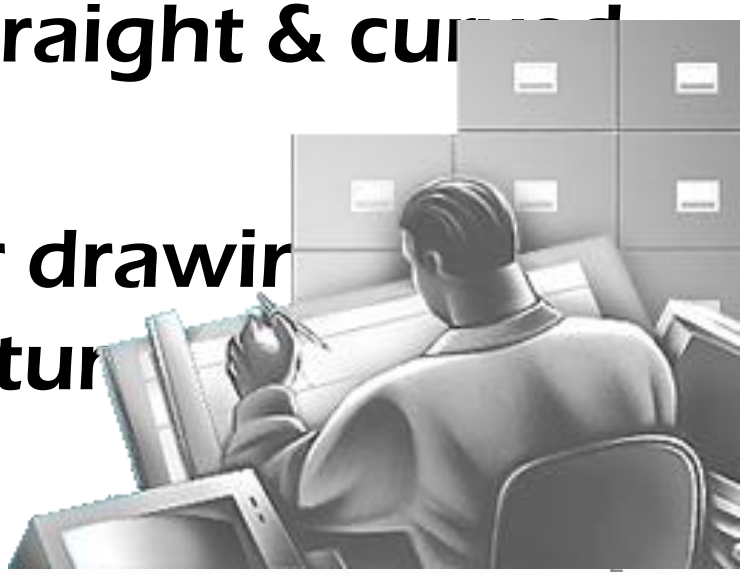
LEARNING OUTCOMES

GEOMETRY

It is expected that students will be able to:

- Build a geometry
- Differentiate types of geometry technique for building straight & cu lines
- Apply the techniques for drawir polygons & normal structur



GEOMETRY

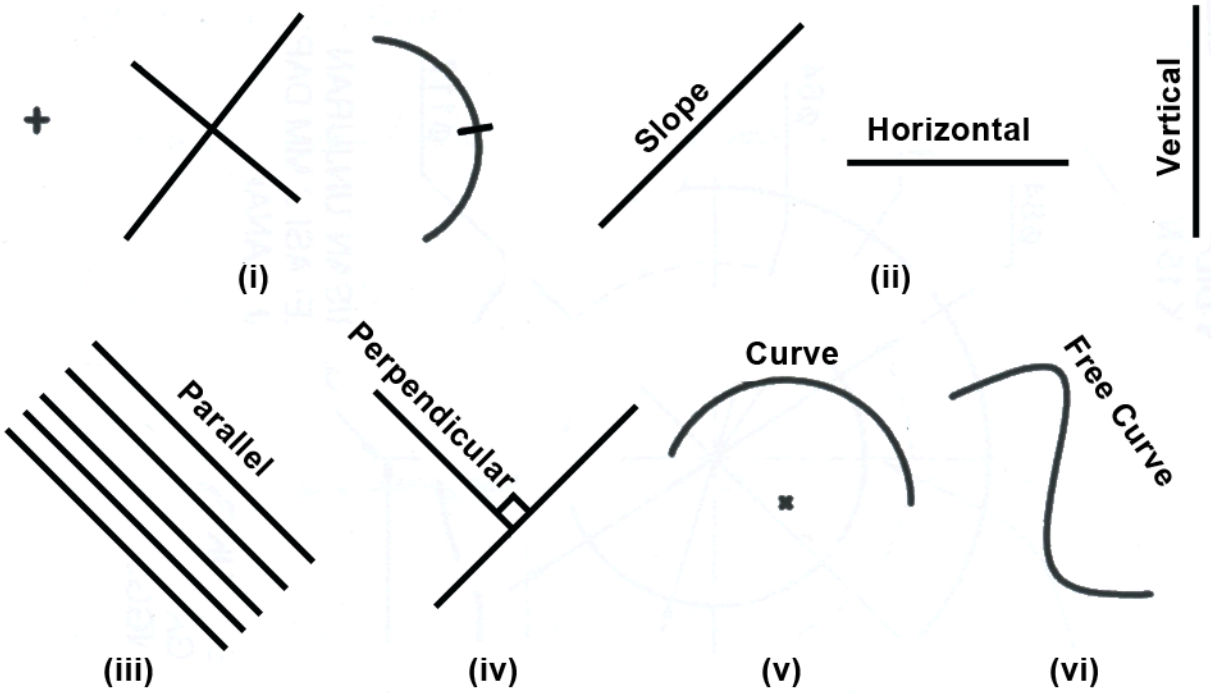
- INTRODUCTION
- BUILDING A GEOMETRY
- GEOMETRY TECHNIQUE FOR BUILDING A STRAIGHT LINE
- GEOMETRY TECHNIQUE FOR BUILDING A CURVED LINE
- TECHNIQUES FOR DRAWING POLYGONS & NORMAL STRUCTURES

INTRODUCTION

- Engineering drawing is built from the basic elements of geometry
- These basic elements are consists of point, line, circle and arc
- The usage and construction of these elements are important to solve problems in engineering drawing.

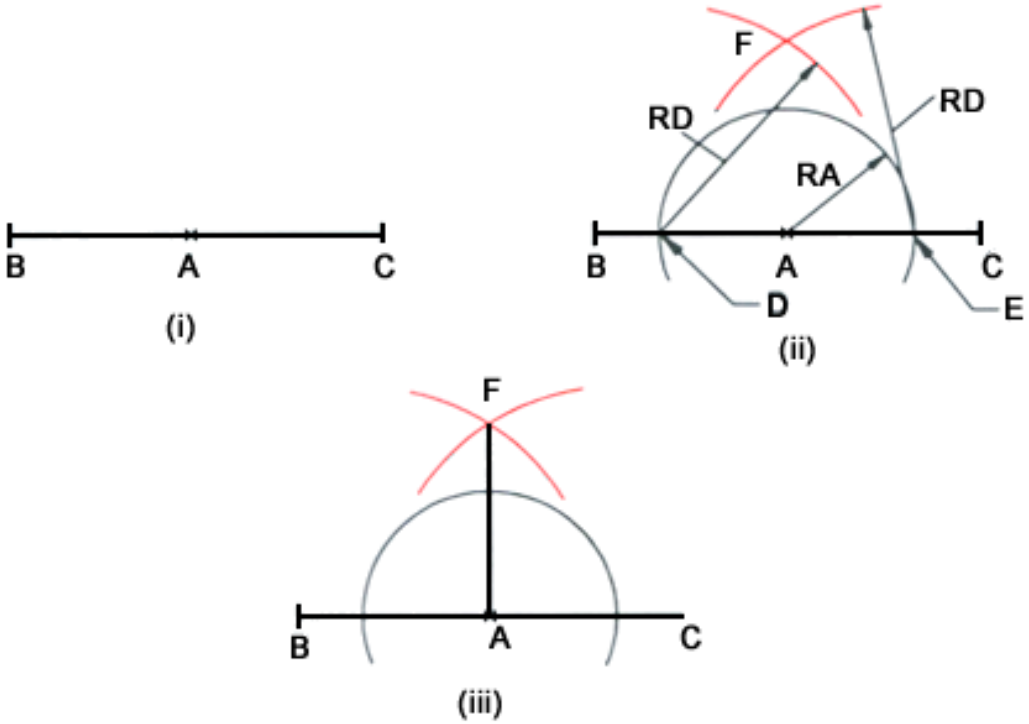
BUILDING A GEOMETRY

- **Geometry elements**



GEOMETRY TECHNIQUE FOR BUILDING A STRAIGHT LINE

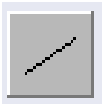
- Building a perpendicular line through a given point on a given line



Manual Technique

Building a perpendicular line through a given point on a given line

Steps using QCAD

- Click on the *create line*  button and click on the *create orthogonal line*  button
- Then click on the line and set the position on the point and click once.
- A perpendicular line is built through a given point on a given line

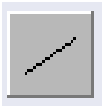
GEOMETRY TECHNIQUE FOR BUILDING A STRAIGHT LINE (cont'd)

- Dividing a line into two parts with the same length

Manual Technique

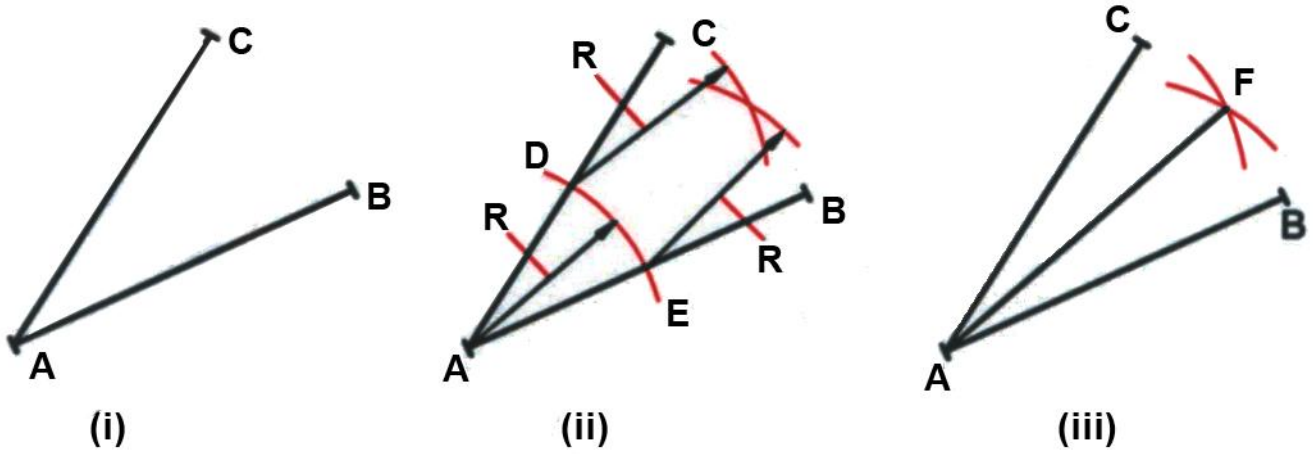
Dividing a line into two parts with the same length

Steps using QCAD

- Click on the *create line*  button and click on the *create orthogonal line*  button
- Then click on the *snap to middles*  button
- Click on the given line and click once.
- The line is divided in two parts by a perpendicular line

GEOMETRY TECHNIQUE FOR BUILDING A STRAIGHT LINE (cont'd)

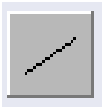
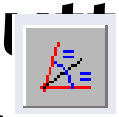
- Dividing a sector into two parts with the same angle



Manual Technique

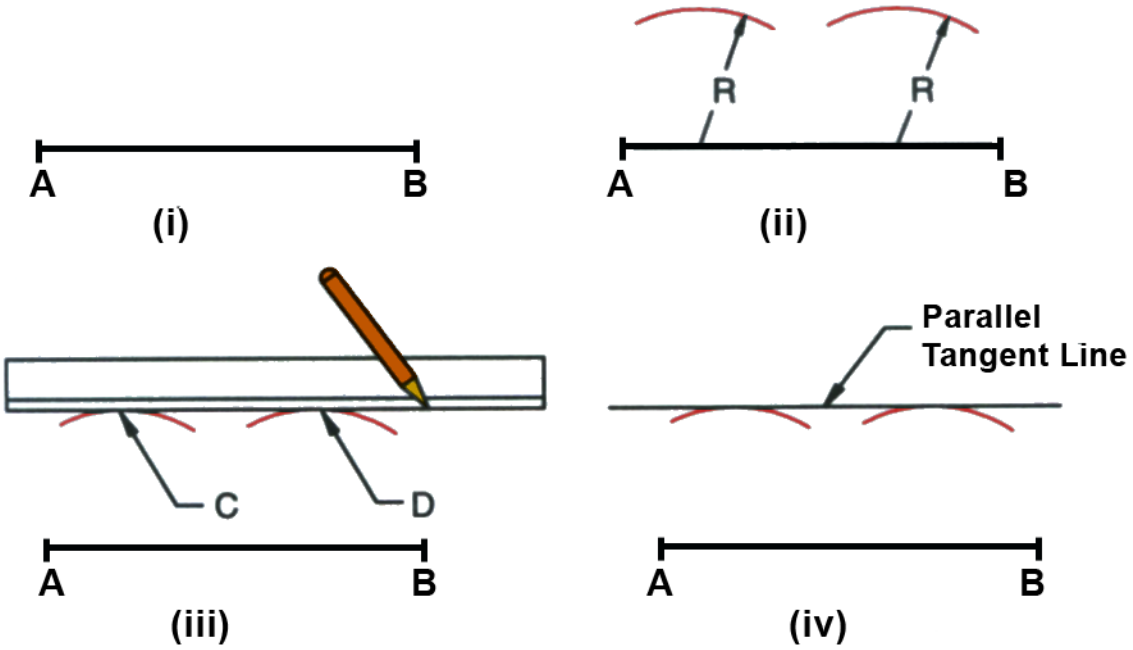
Dividing a sector into two parts with the same angle

Steps using QCAD

- Click on the *create line*  button and click on the *create bisectors*  button
- Click one side of the given sector and place your cursor near the other side of the sector and click once
- The sector is divided into two parts with the same angle

GEOMETRY TECHNIQUE FOR BUILDING A STRAIGHT LINE (cont'd)

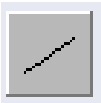
- Building a parallel line with a given distance



Manual Technique

Building a parallel line with a given distance

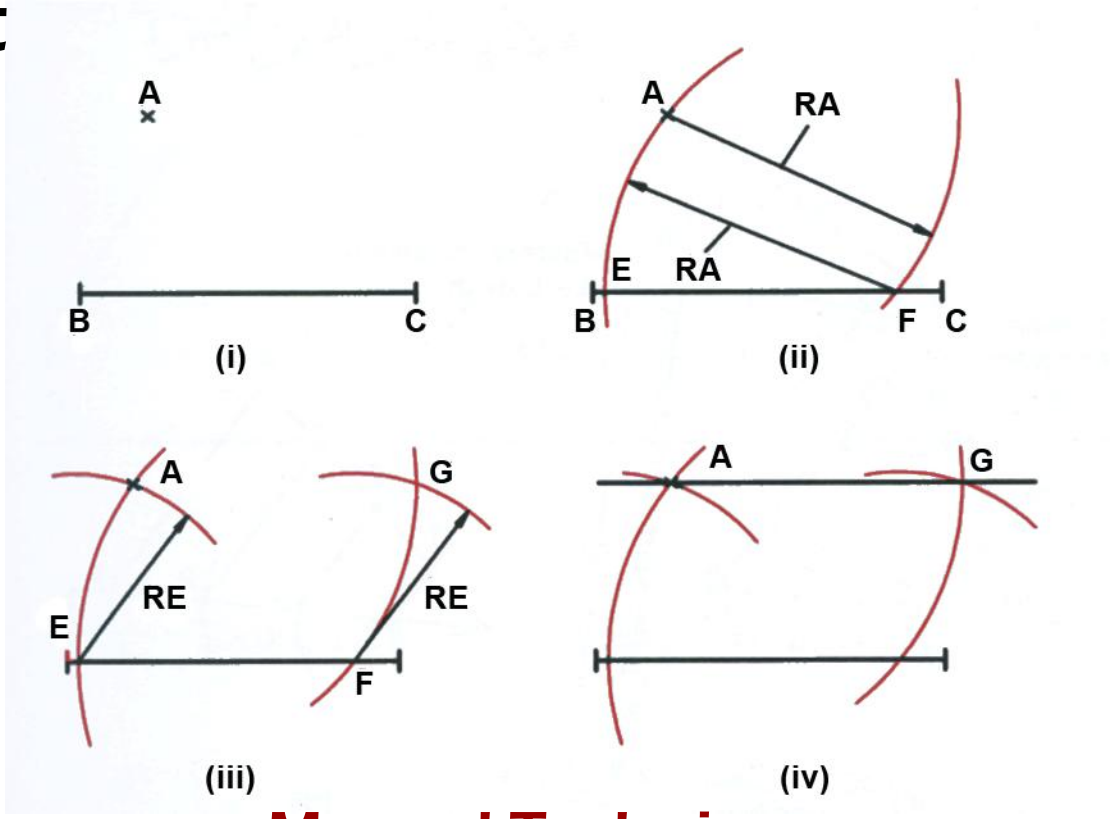
Steps using QCAD

- Click on the *create line*  button and click on the *create parallels*  button
- Fill in the distance from the given line in the box 

- Place your cursor near the given line on the side that you want to draw the parallel line then click once
- The parallel line with specified distance is built

GEOMETRY TECHNIQUE FOR BUILDING A STRAIGHT LINE (cont'd)

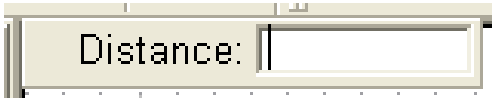
- Building a parallel line through a given point



Manual Technique

Building a parallel line through a given point

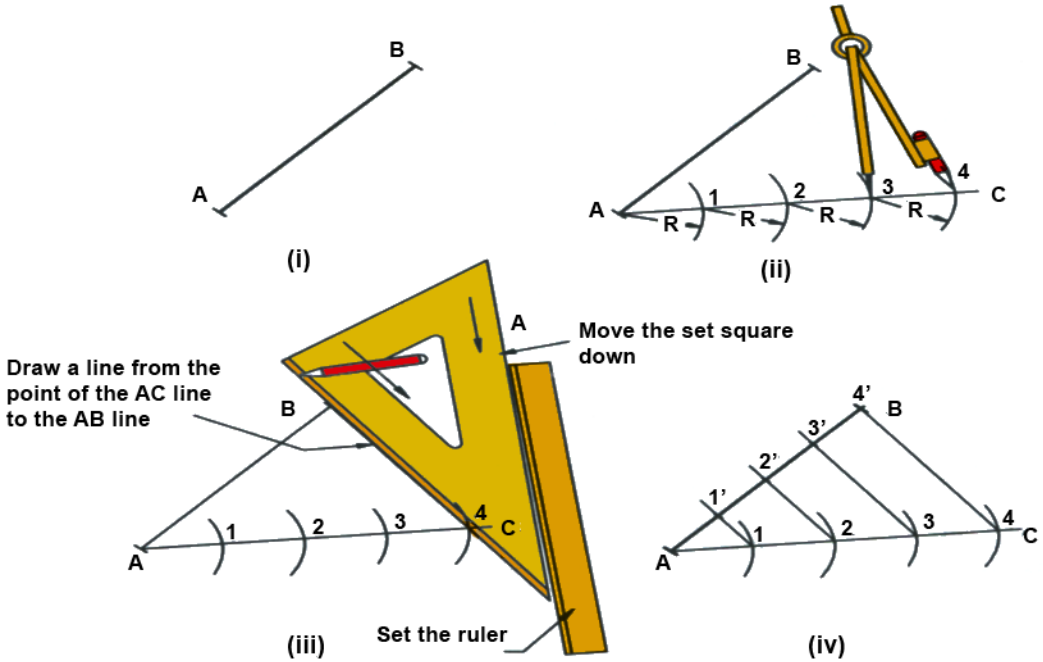
Steps using QCAD

- Click the *measuring function*  button and click the *distance between line and a point*  button to measure the distance between the given line and point
- Click on the *create line*  button and click on the *create parallels*  button
- Fill in the measured distance from the given line in the box 

- Place your cursor near the given line on the side that you want to draw the parallel line then click once
- The parallel line is built through the given point from the given line

GEOMETRY TECHNIQUE FOR BUILDING A STRAIGHT LINE (cont'd)

- Dividing a given line into several parts with the same length



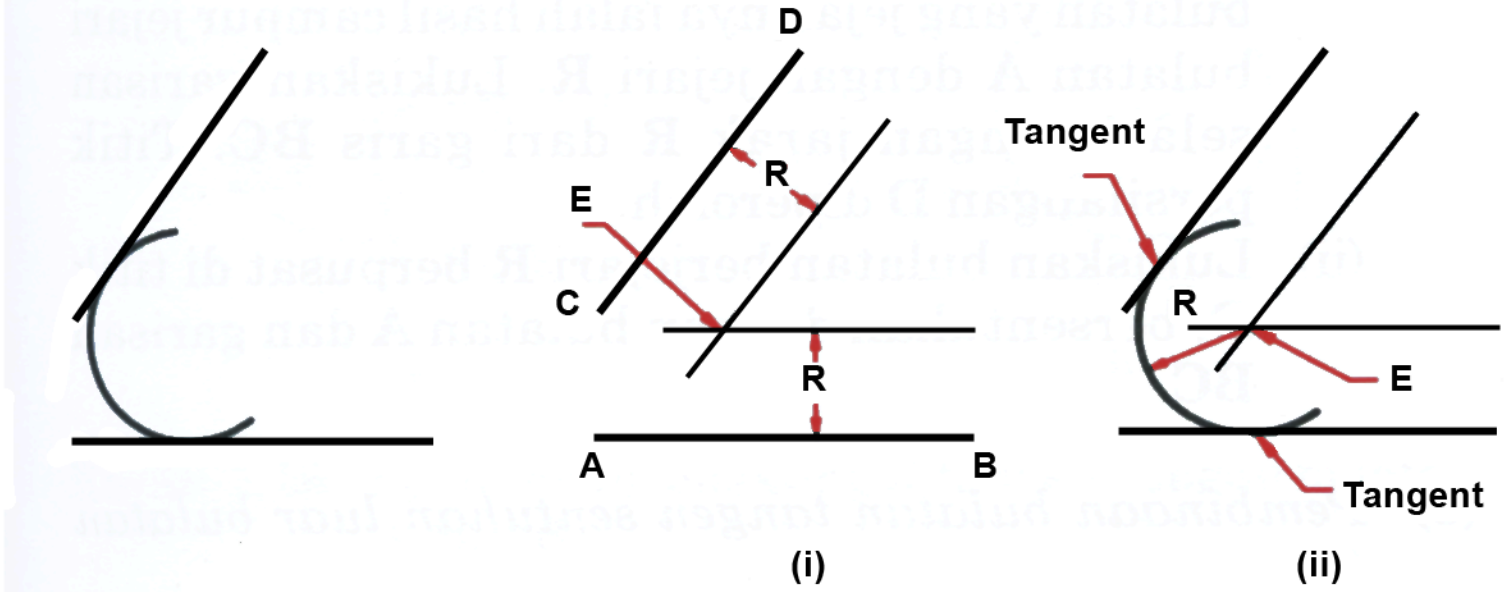
Manual Technique

Dividing a given line into several parts with the same length

- **Steps using QCAD**
- Build a line AC at a suitable distance from given line AB
- Draw arcs with radius R to divide the line AC from point A (click on the *create circle*  button and click the *create circle by centre and radius*  button)
- The number of arcs drawn must be the same with amount of parts that the given line want to be divided
- From point B, draw parallel lines between line AB and AC
- A line divided into several parts with the same length is built

GEOMETRY TECHNIQUE FOR BUILDING A CURVED LINE

- Building an arc tangent between two given lines



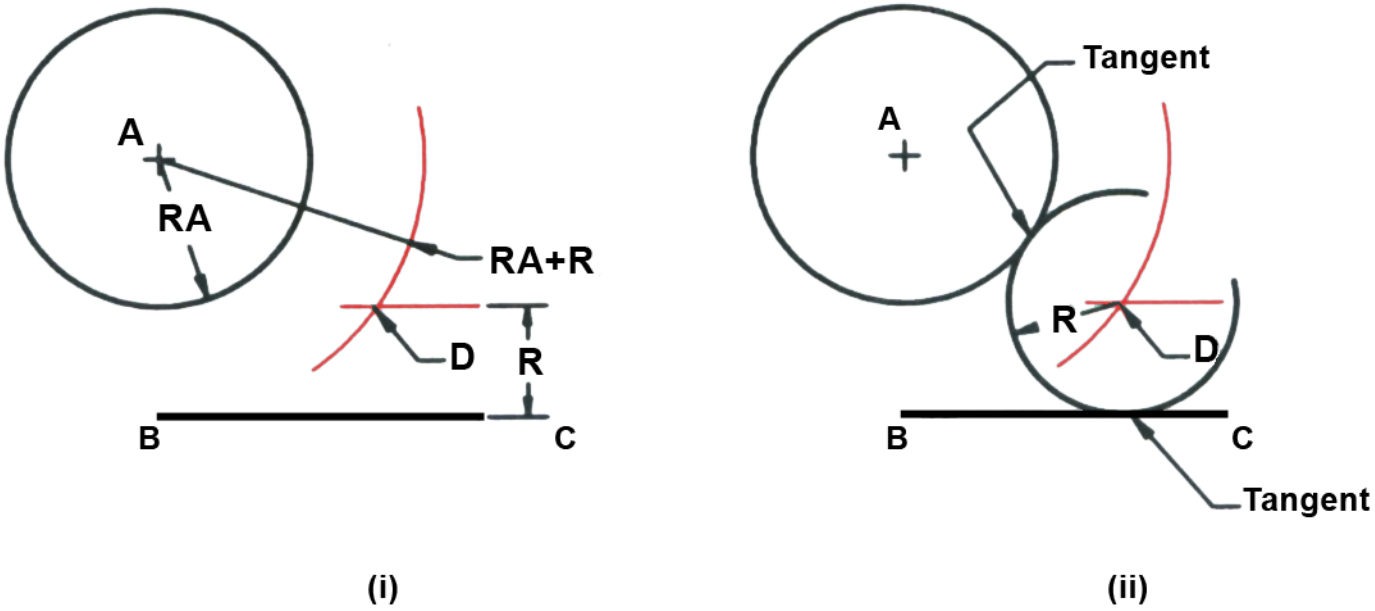
Manual Technique

Building an arc tangent between two given lines

- Steps using QCAD
- Draw parallel lines from the two given lines with a distance same as the radius of the arc
- The parallel line will cross at point E (center of the arc)
- Then draw the circle/arc from the centre point

GEOMETRY TECHNIQUE FOR BUILDING A CURVED LINE (cont'd)

- Building an arc tangent between a circle and a line



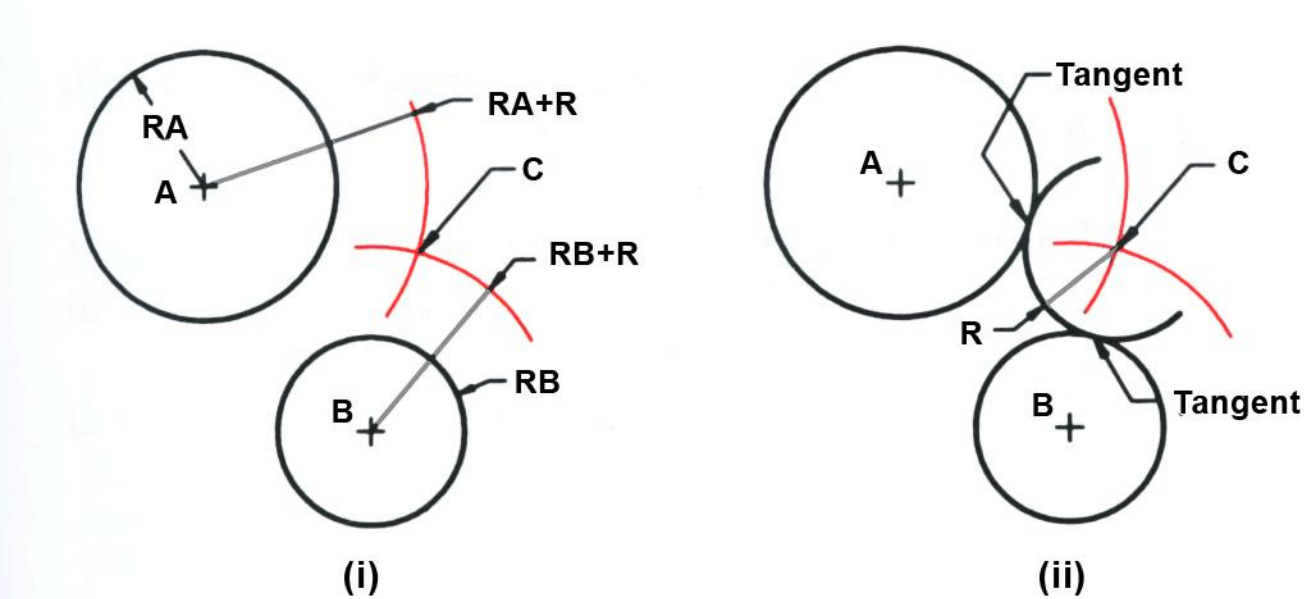
Manual Technique

Building an arc tangent between a circle and a line

- **Steps using QCAD**
- Draw a parallel line with the distance same as the radius of the arc from the given line
- Then draw an arc/circle from the centre of the given circle with the radius (radius of given circle + radius of arc to be built)
- The parallel line and the circle/arc will cross at D (center of arc to be built)
- From point D draw the arc tangent between the given circle and line

GEOMETRY TECHNIQUE FOR BUILDING A CURVED LINE (cont'd)

- Building an arc tangent between two circles (circle C touching both outer circles)



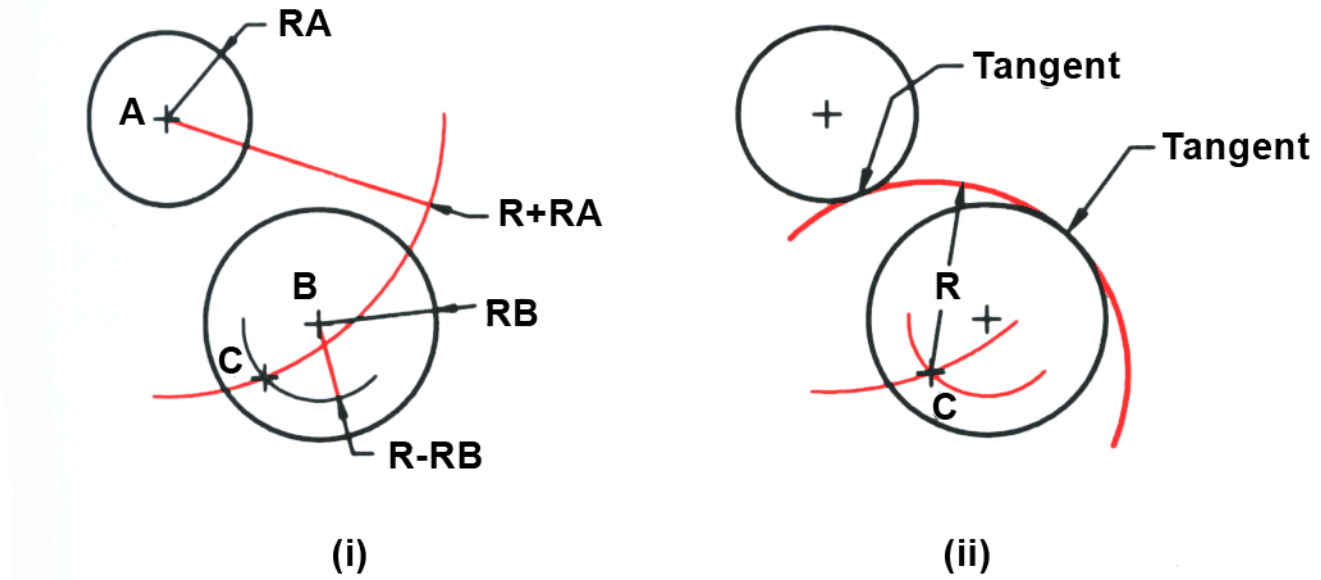
Manual Technique

Building an arc tangent between two circles (circle C touching both outer circles)

- Steps using QCAD
- Draw an arc/circle from the centre of the two given circle with the radius (radius of given circle + radius of arc to be built)
- The circles/arcs will cross at C (center of arc to be built)
- From point C draw the arc tangent between the two circles(circle C touching both outer circles)

GEOMETRY TECHNIQUE FOR BUILDING A CURVED LINE (cont'd)

- Building an arc tangent between two circles (circle C touching outer and inner circle)



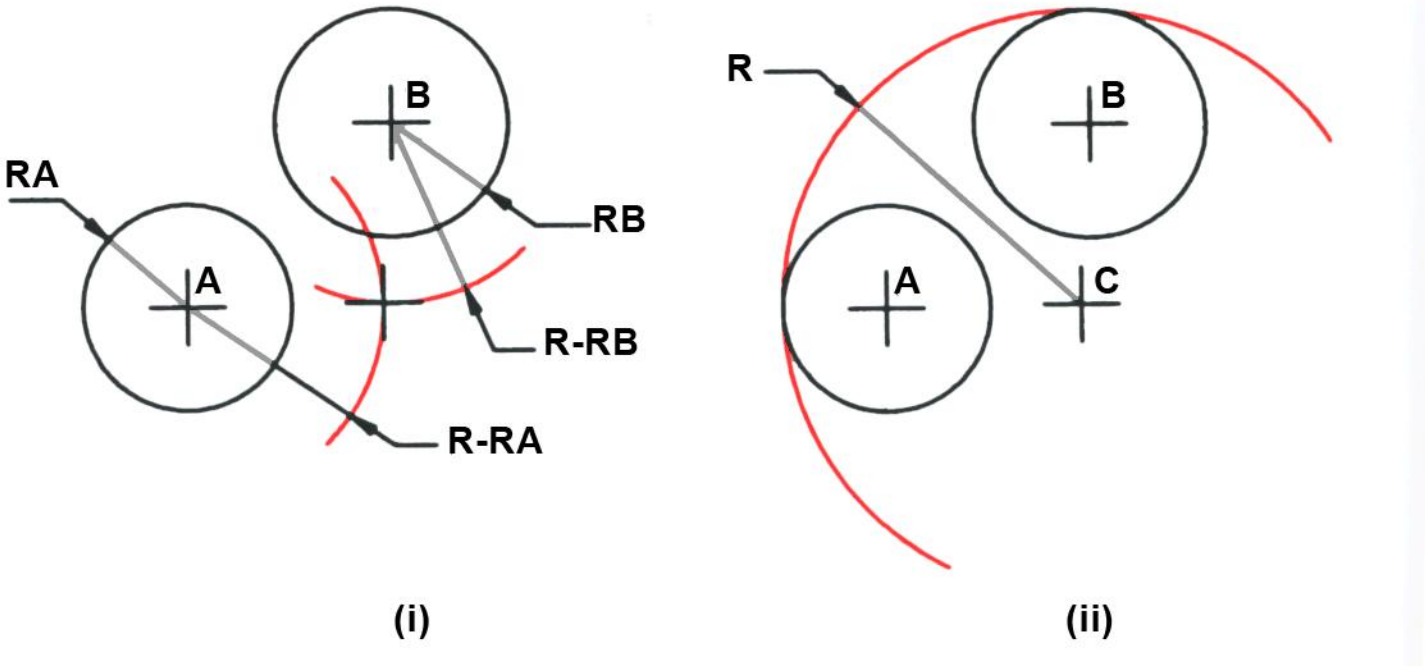
Manual Technique

Building an arc tangent between two circles (circle C touching outer and inner circle)

- **Steps using QCAD**
- Draw an arc/circle from the centre of the given circle (the circle that the arc touches its outer surface) with the radius (radius of given circle + radius of arc to be built)
- Then draw an arc/circle from the centre of the given circle (the circle that the arc touches its inner surface) with the radius (radius of arc to be built - radius of given circle)
- The circles/arcs will cross at C (center of arc to be built)
- From point C draw the arc tangent between the two circles (circle C touching outer and inner circle)

GEOMETRY TECHNIQUE FOR BUILDING A CURVED LINE (cont'd)

- Building an arc tangent between two circles (circle C touching both inner circles)



Manual Technique

Building an arc tangent between two circles (circle C touching both inner circles)

- Steps using QCAD
- Draw an arc/circle from the centre of the two given circle with the radius (radius of arc to be built - radius of given circle)
- The circles/arcs will cross at C (center of arc to be built)
- From point C draw the arc tangent between the two circles(circle C touching both inner circles)

GEOMETRY DRAWING

- Example of geometry drawing using technique for building straight and curved line