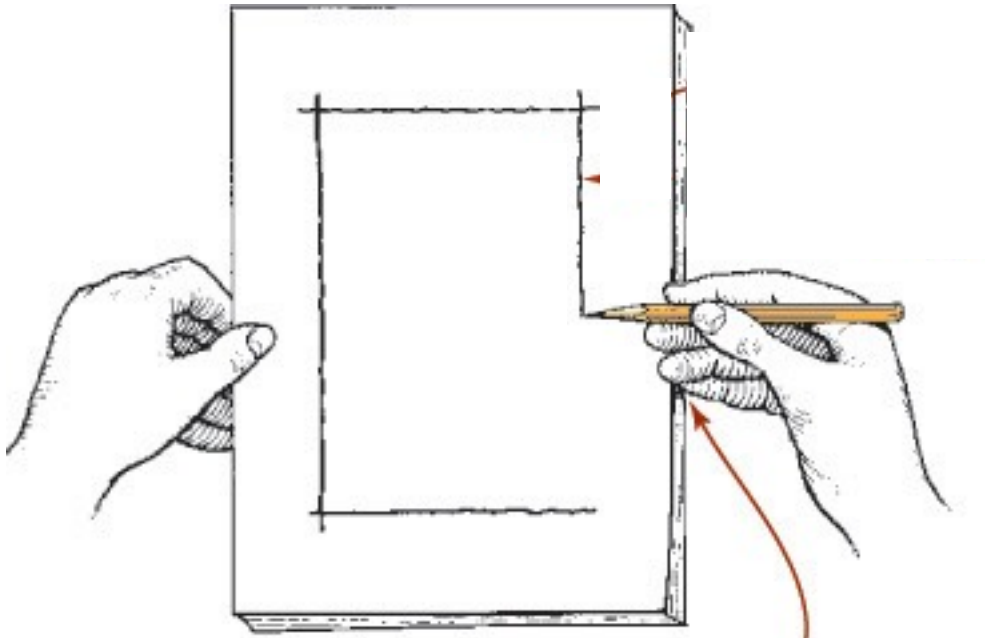


Source: F. Giesecke: Technical Drawing with Engineering Graphics

Electronic Engineering (ELE):

ENGINEERING DESIGN: EXERCISE 1

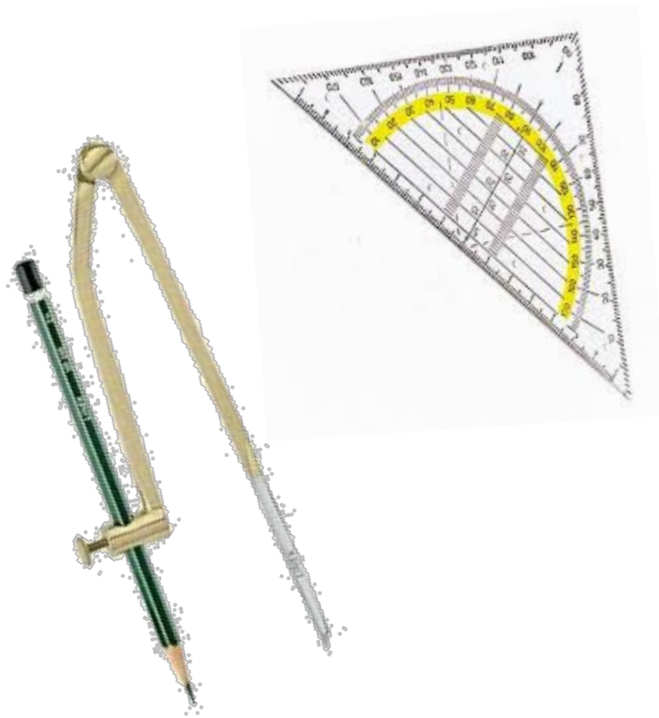
Engineering Design: **Exercise Agenda**

0. Organization of Exercise
1. Exercise 1: Basic elements
2. Exercise 2: Projections
3. Exercise 3: Section views and Dimensions
4. Exercise 4: Tolerances and Surface finish
5. Exercise 5: Screws
6. Exercise 6: Basic Machine Elements

Engineering Design: **Learning Materials and Tools**

To work on the exercises you need the following tools:

- Printed exercise sheets (from moodle)
- Mechanical pencils
- compasses
- Rules
- Set square
- Rubber



Engineering Design: **Exercise Procedure**

The Exercise procedure will be:

- Presentation of problem
- Each students works on a solution on his own
- Questions may be written in the chat and collected
- After 5-10 Minutes the solution will be presented

Exercise 1: geometrical basic elements to get a feeling for working with ruler, compasses, set square

Engineering Design: **Exercise 1: Agenda**

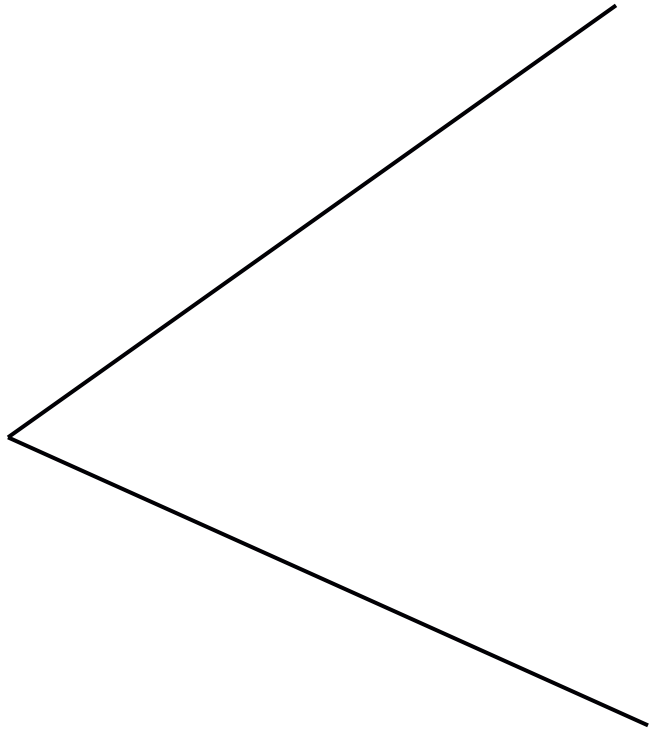
0. Organization of Exercise
1. Exercise 1: Basic elements
2. Exercise 2: Projections
3. Exercise 3: Section views and Dimensions
4. Exercise 4: Tolerances and Surface finish
5. Exercise 5: Screws
6. Exercise 6: Basic Machine Elements

Engineering Design: **Exercise 1: Agenda**

0. Organization of Exercise
1. Exercise 1: Basic elements
    1. Bisecting line of an angle
    2. Bisector of to lines
    3. Rounding of an angle
    4. Tangent on circle
    5. Pentagon in circle
    6. Tangent on two circles

Engineering Design: **Exercise 1**

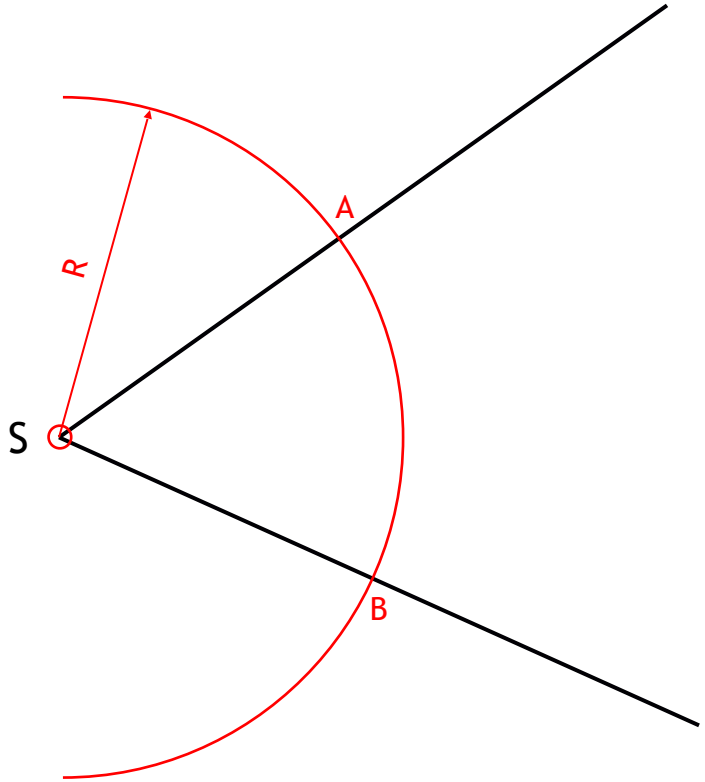
Problem 1.1: Construct the bisecting line of the angle!



Engineering Design: **Exercise 1**

Problem 1.1: Construct the bisecting line of the angle!

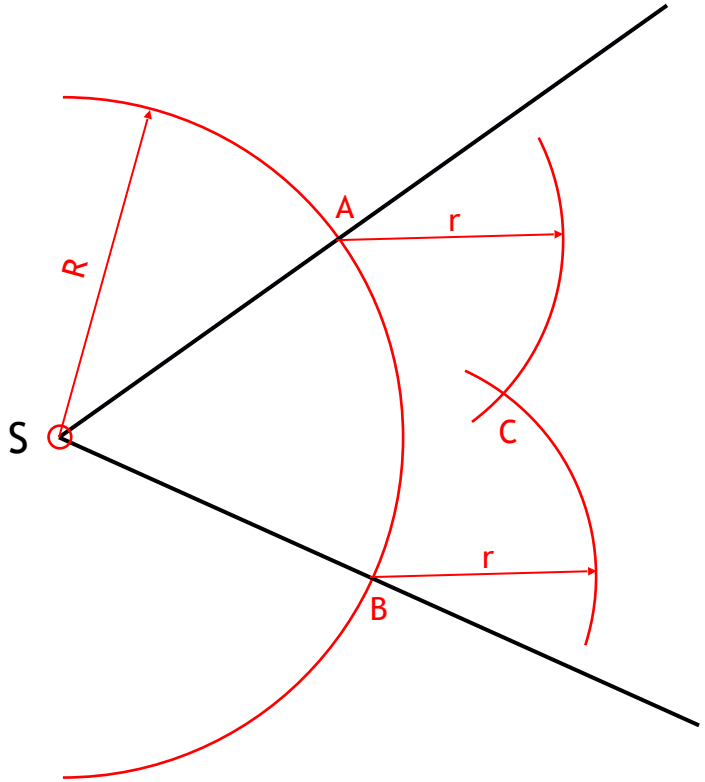
Solution:



Engineering Design: **Exercise 1**

Problem 1.1: Construct the bisecting line of the angle!

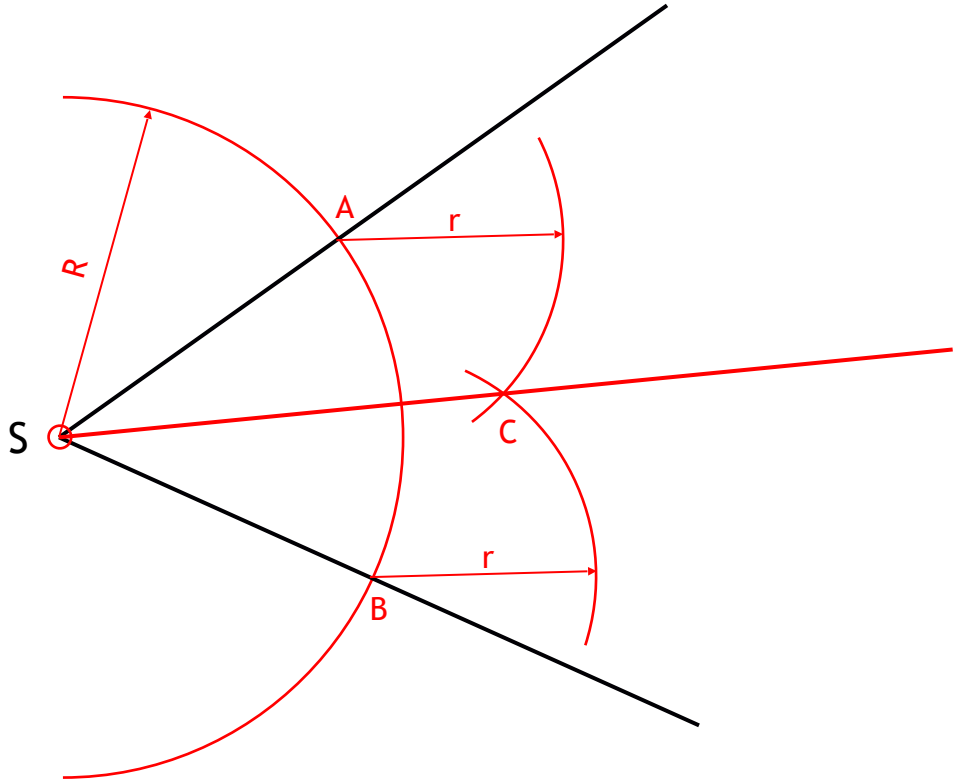
Solution:



Engineering Design: **Exercise 1**

Problem 1.1: Construct the bisecting line of the angle!

Solution:

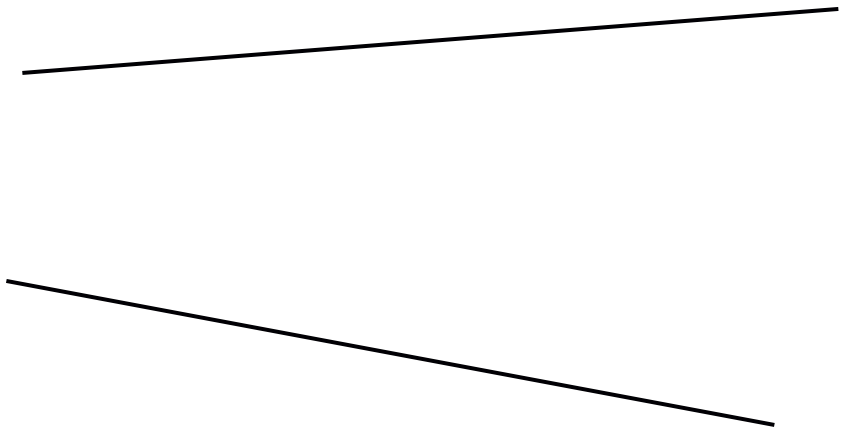


Engineering Design: **Exercise 1: Agenda**

0. Organization of Exercise
1. Exercise 1: Basic elements
    1. Bisecting line of an angle
    2. Bisector of to lines
    3. Rounding of an angle
    4. Tangent on circle
    5. Pentagon in circle
    6. Tangent on two circles

Engineering Design: **Exercise 1**

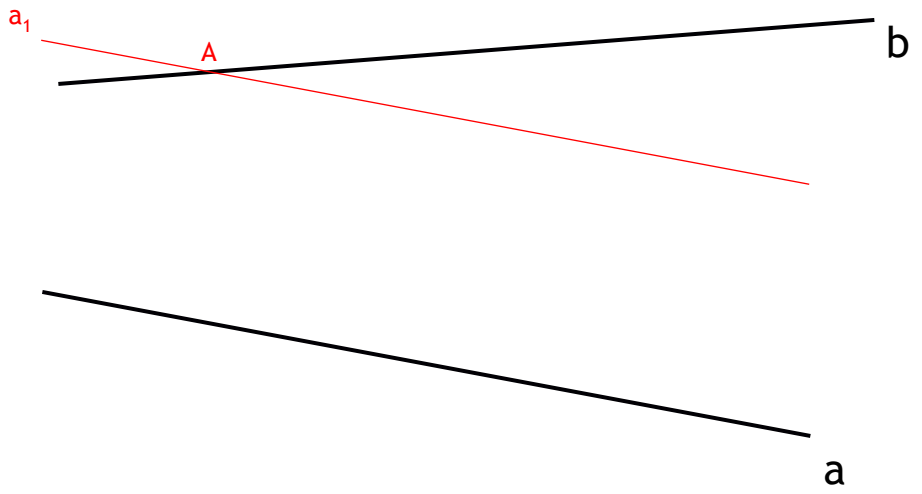
Problem 1.2: Construct the bisecting line of the angle!



Engineering Design: **Exercise 1**

Problem 1.2: Construct the bisecting line of the angle!

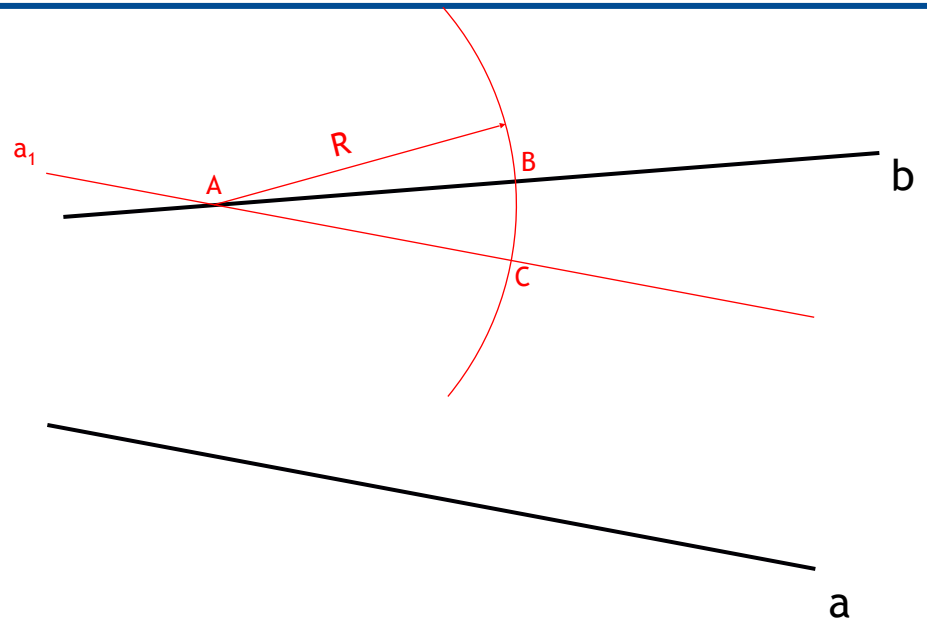
Solution:



Engineering Design: **Exercise 1**

Problem 1.2: Construct the bisecting line of the angle!

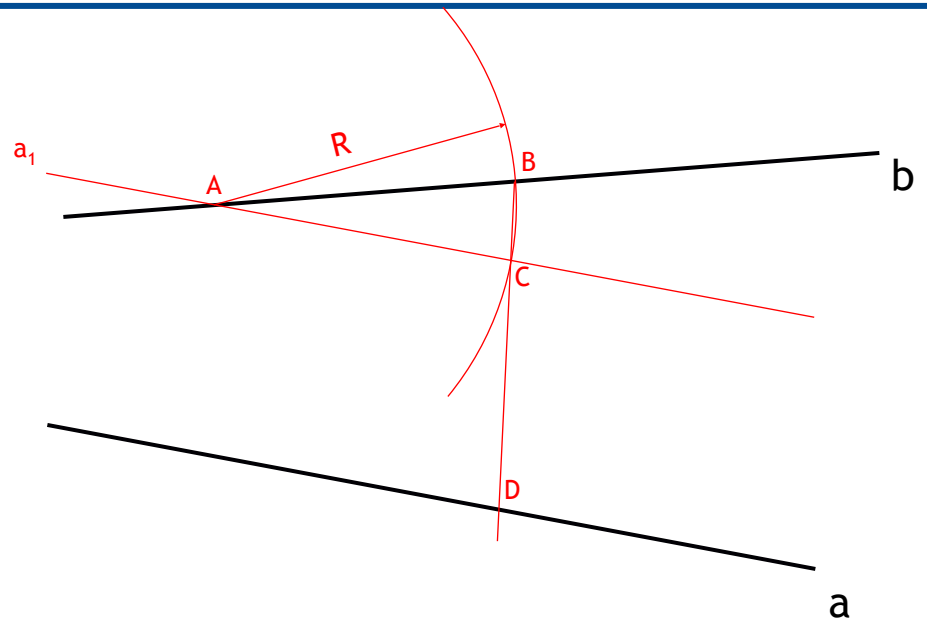
Solution:



Engineering Design: **Exercise 1**

Problem 1.2: Construct the bisecting line of the angle!

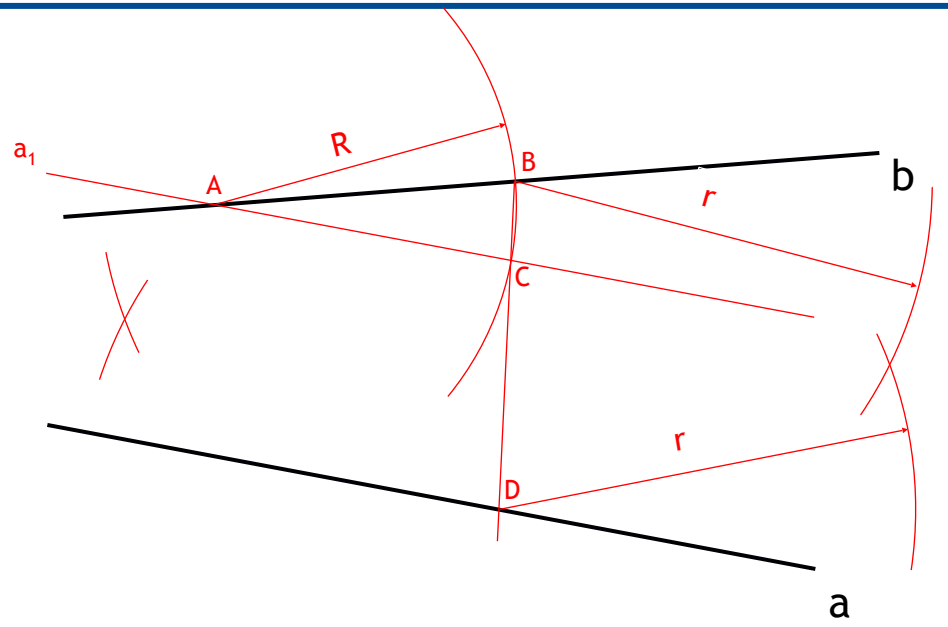
Solution:



Engineering Design: **Exercise 1**

Problem 1.2: Construct the bisecting line of the angle!

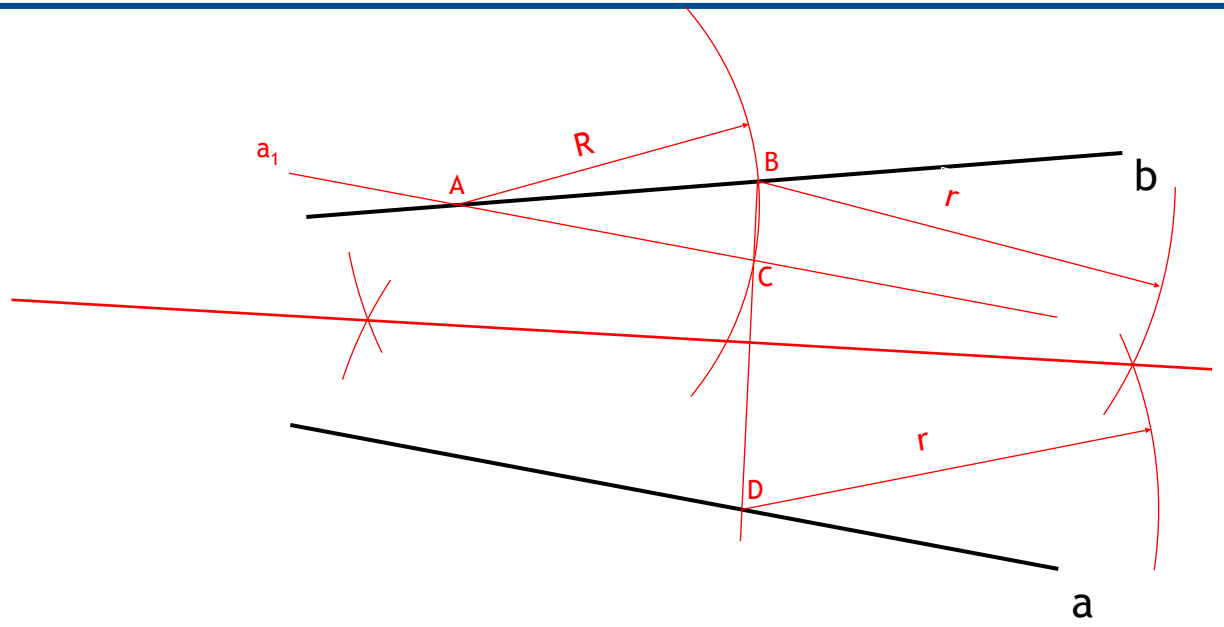
Solution:



Engineering Design: **Exercise 1**

Problem 1.2: Construct the bisecting line of the angle!

Solution:

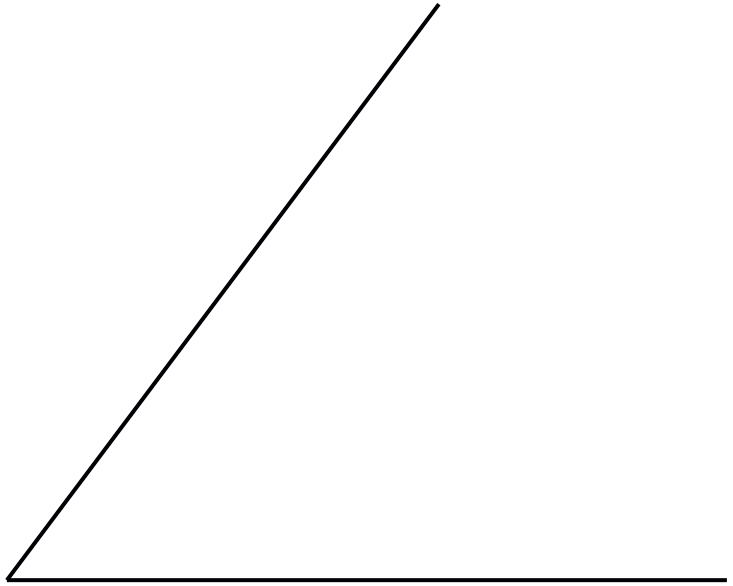


Engineering Design: **Exercise 1: Agenda**

0. Organization of Exercise
1. Exercise 1: Basic elements
    1. Bisecting line of an angle
    2. Bisector of to lines
    3. Rounding of an angle
    4. Tangent on circle
    5. Pentagon in circle
    6. Tangent on two circles

Engineering Design: **Exercise 1**

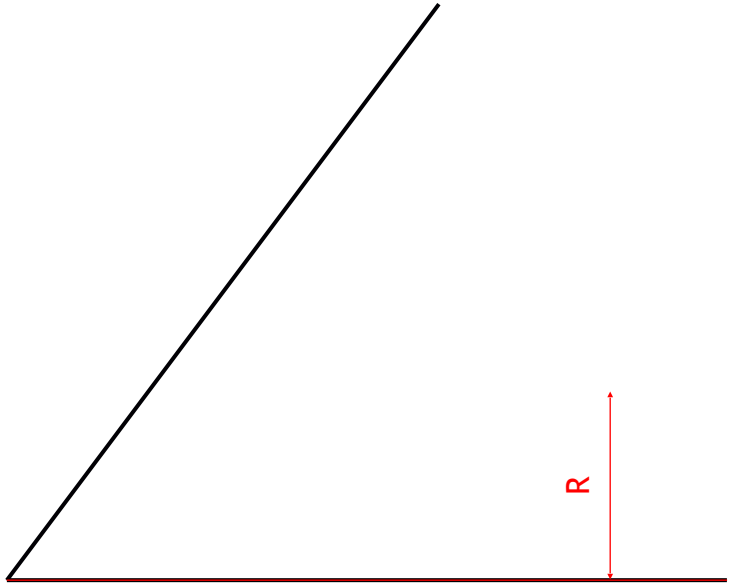
Problem 1.3: Round the angle with a radius R = 20 mm!



Engineering Design: **Exercise 1**

Problem 1.3: Round the angle with a radius R = 20 mm!

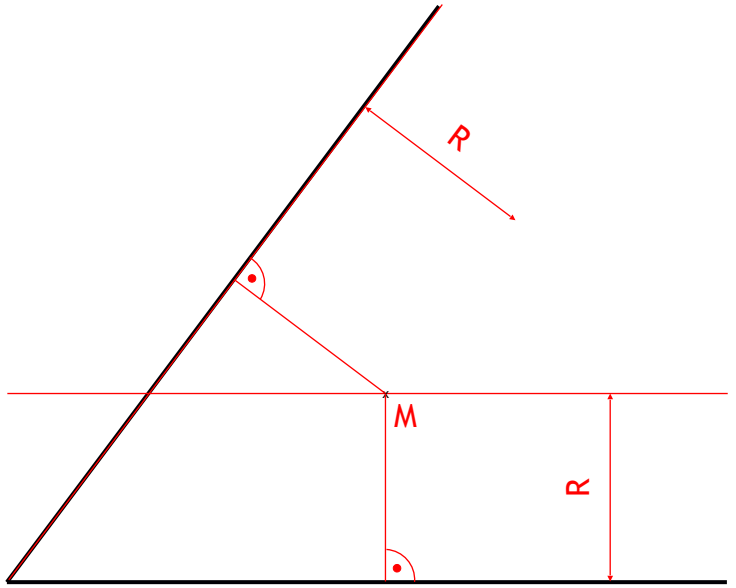
Solution:



Engineering Design: **Exercise 1**

Problem 1.3: Round the angle with a radius R = 20 mm!

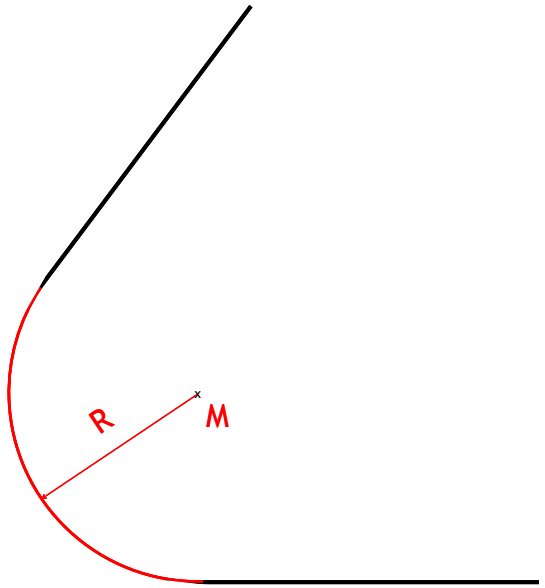
Solution:



Engineering Design: **Exercise 1**

Problem 1.3: Round the angle with a radius R = 20 mm!

Solution:

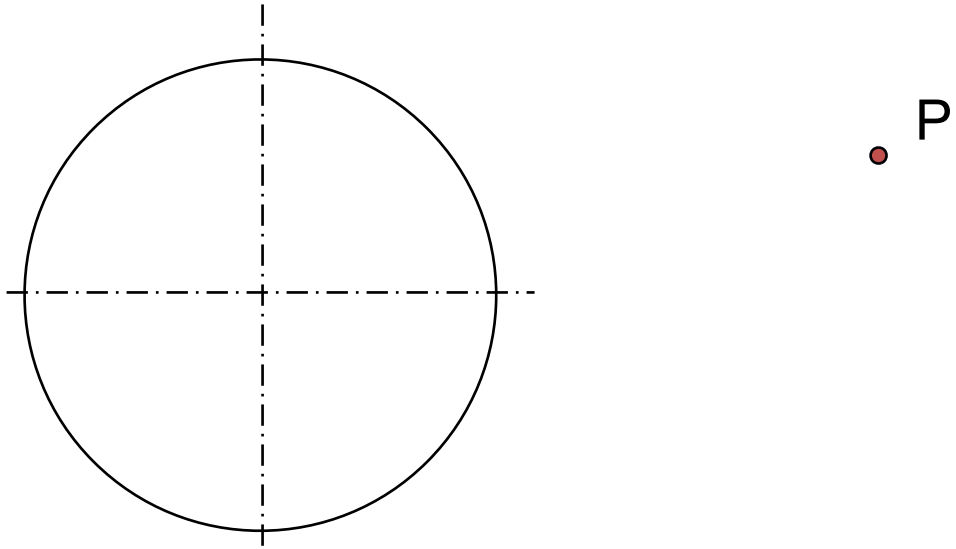


Engineering Design: **Exercise 1: Agenda**

0. Organization of Exercise
1. Exercise 1: Basic elements
    1. Bisecting line of an angle
    2. Bisector of to lines
    3. Rounding of an angle
    4. Tangent on circle
    5. Pentagon in circle
    6. Tangent on two circles

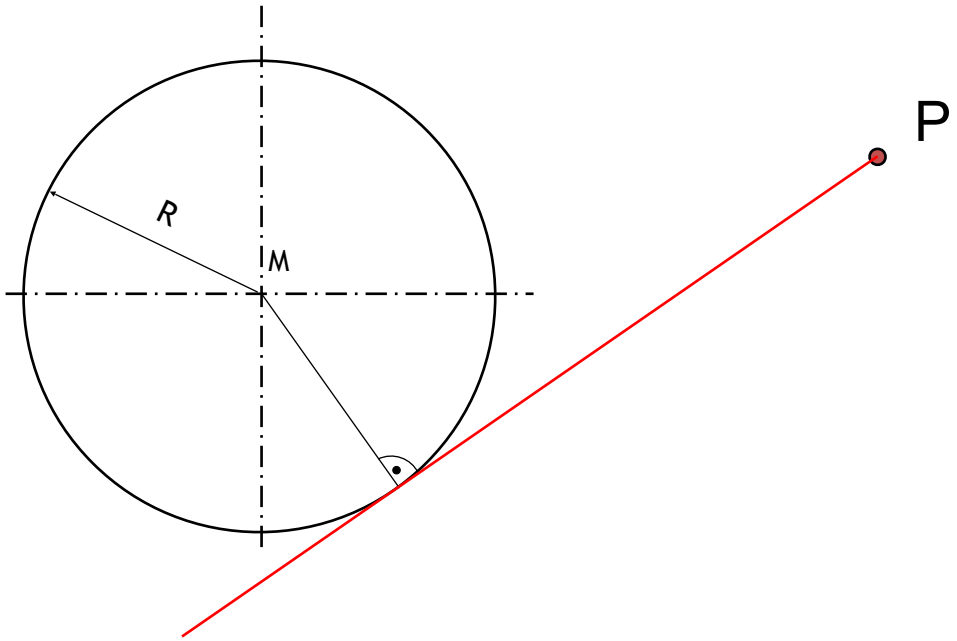
Engineering Design: **Exercise 1**

Problem 1.4: Construct the tangent from point P onto the circle!



Engineering Design: **Exercise 1**

Problem 1.4: Construct the tangent from point P onto the circle!



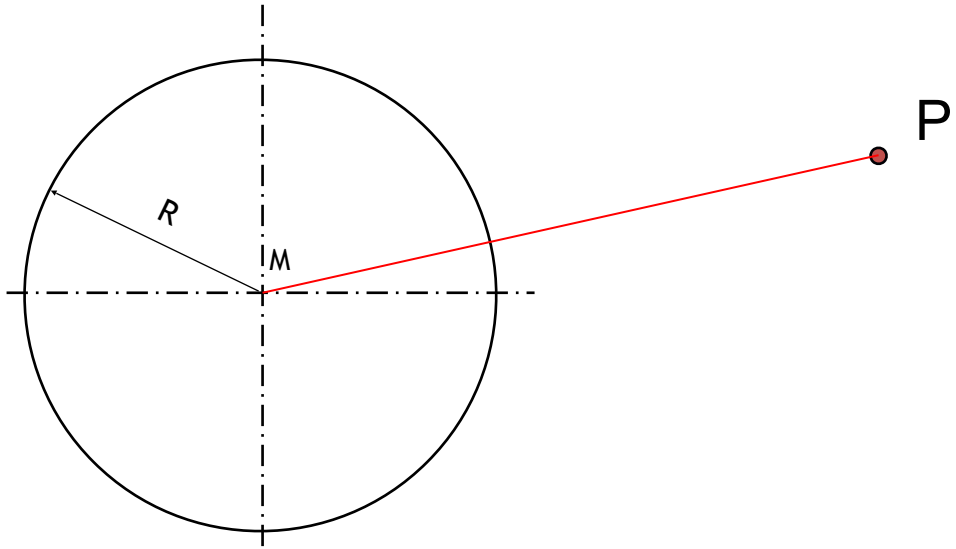
Excursus: Tangent

- A line that touches a given curve (here: circle) at a certain point
- The tangent is perpendicular to the radius at the touching point.

Engineering Design: **Exercise 1**

Problem 1.4: Construct the tangent from point P onto the circle!

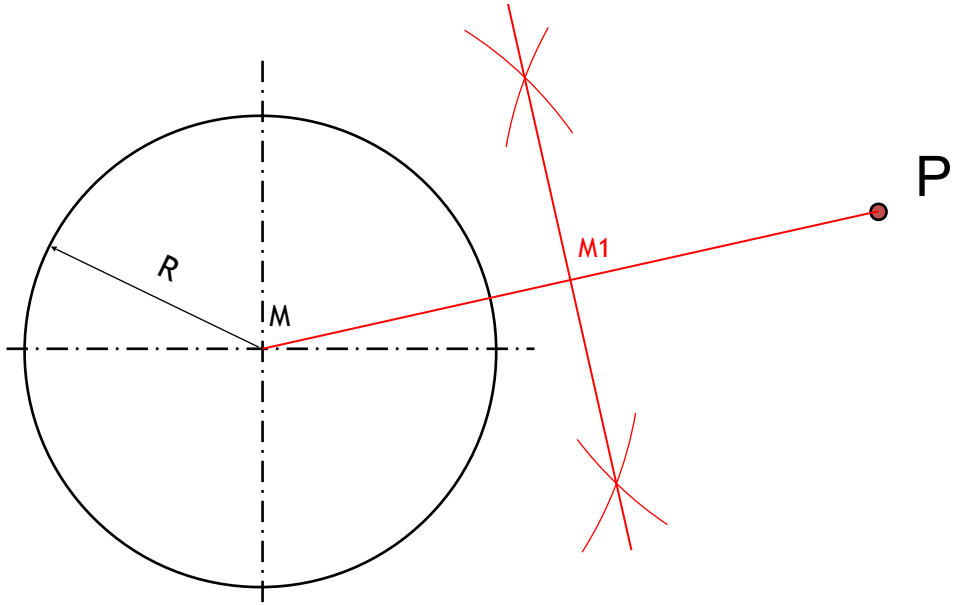
Solution:



Engineering Design: **Exercise 1**

Problem 1.4: Construct the tangent from point P onto the circle!

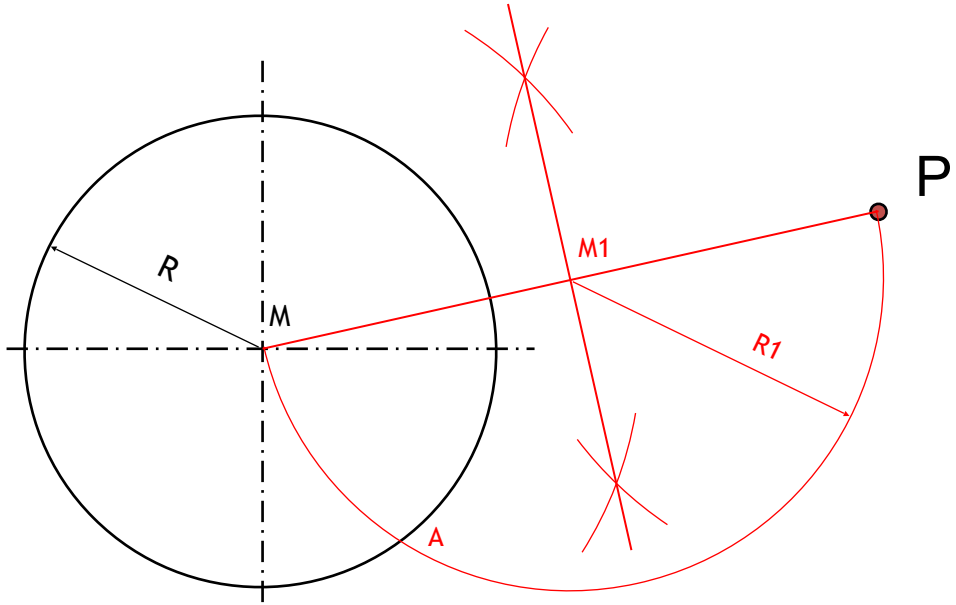
Solution:



Engineering Design: **Exercise 1**

Problem 1.4: Construct the tangent from point P onto the circle!

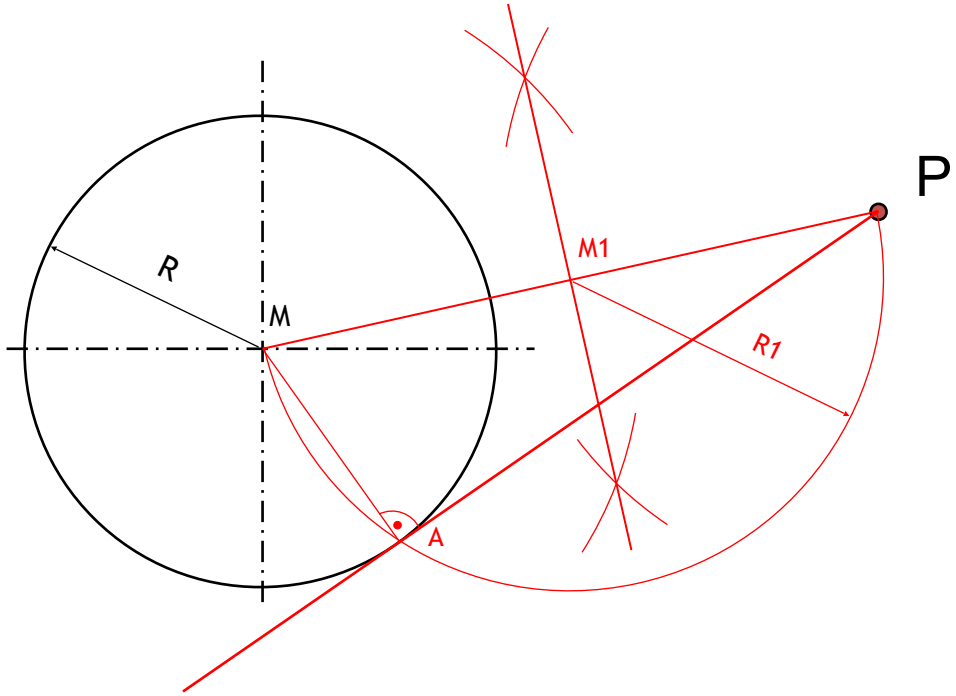
Solution:



Engineering Design: **Exercise 1**

Problem 1.4: Construct the tangent from point P onto the circle!

Solution:



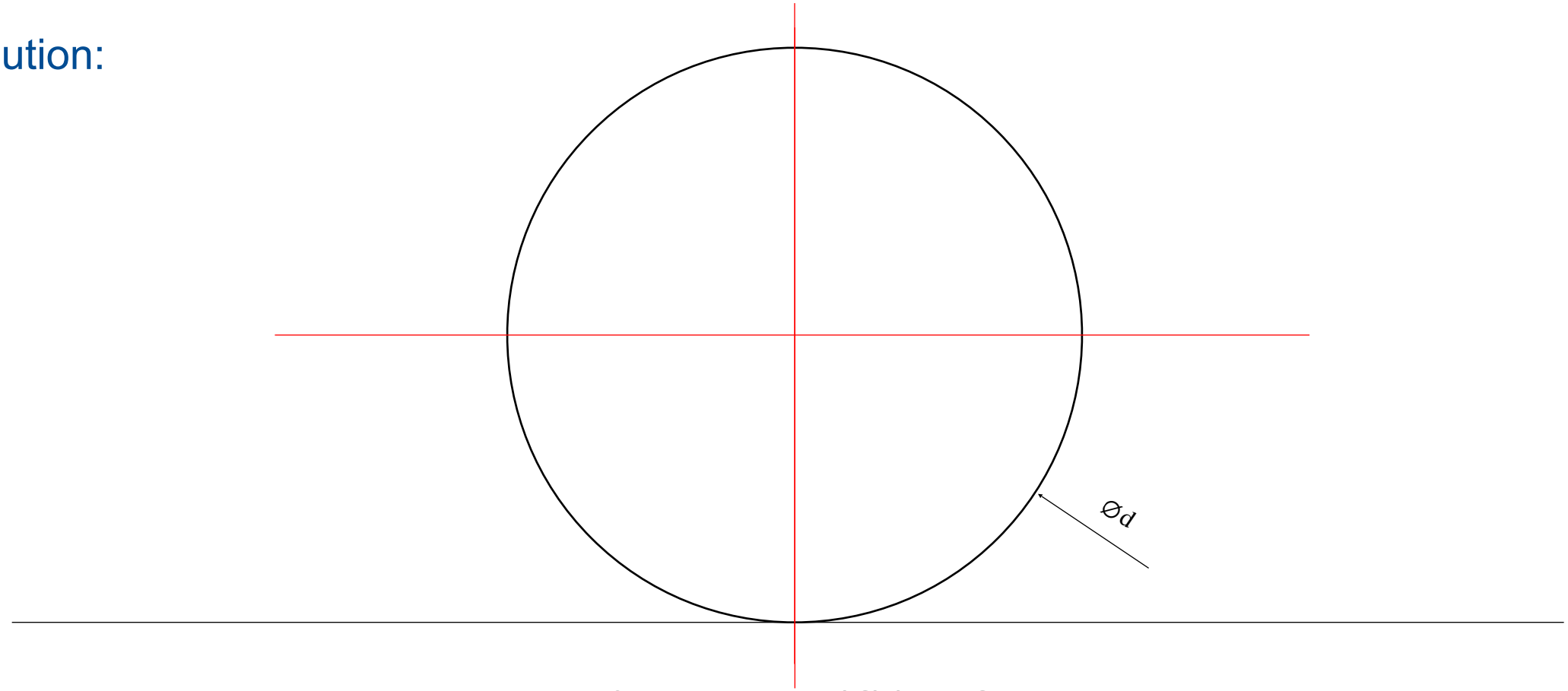
Engineering Design: **Exercise 1: Agenda**

0. Organization of Exercise
1. Exercise 1: Basic elements
    1. Bisecting line of an angle
    2. Bisector of to lines
    3. Rounding of an angle
    4. Tangent on circle
    5. Pentagon in circle
    6. Tangent on two circles

Engineering Design: **Exercise 1**

Problem 1.5: Construct a regular pentagon into a circle with diameter d = 100 mm!

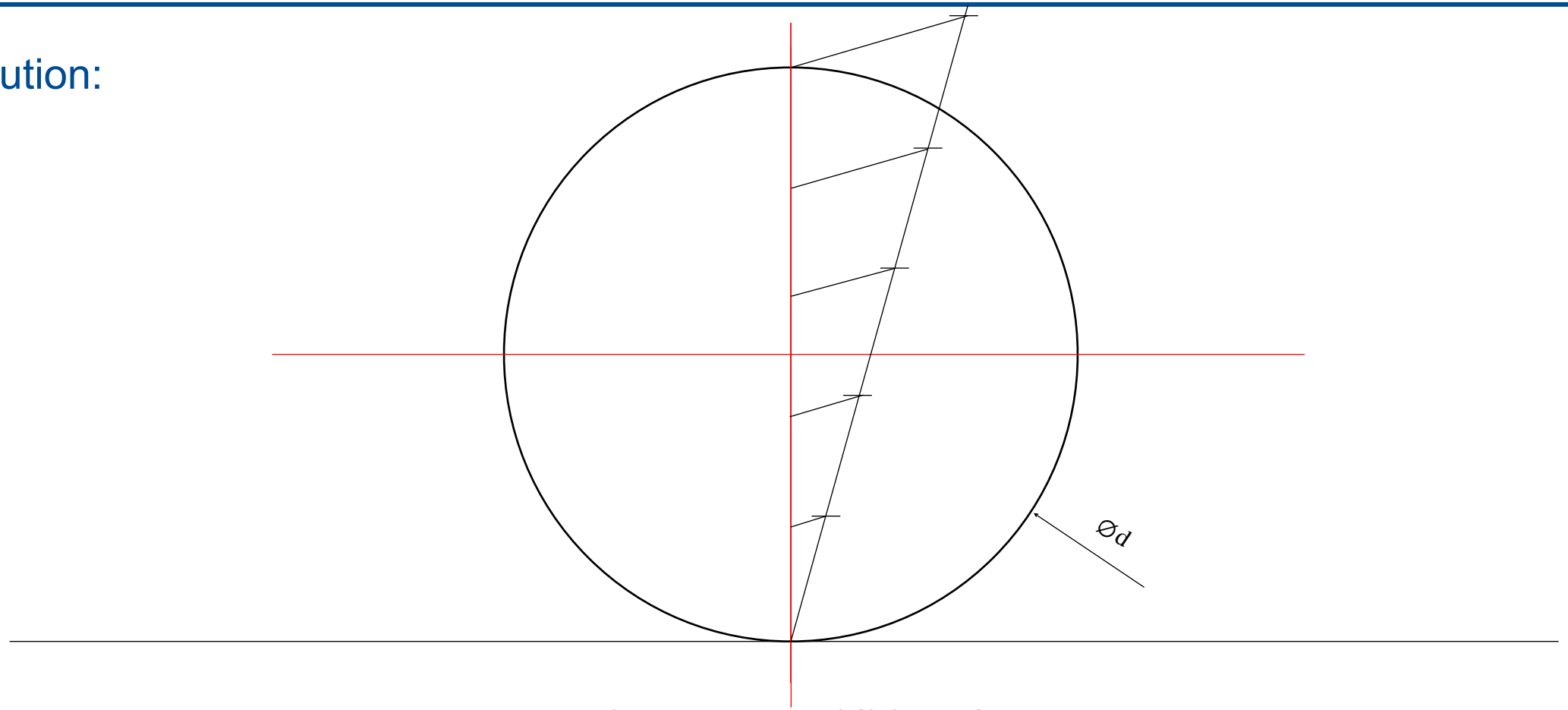
Solution:



Engineering Design: **Exercise 1**

Problem 1.5: Construct a regular pentagon into a circle with diameter d = 100 mm!

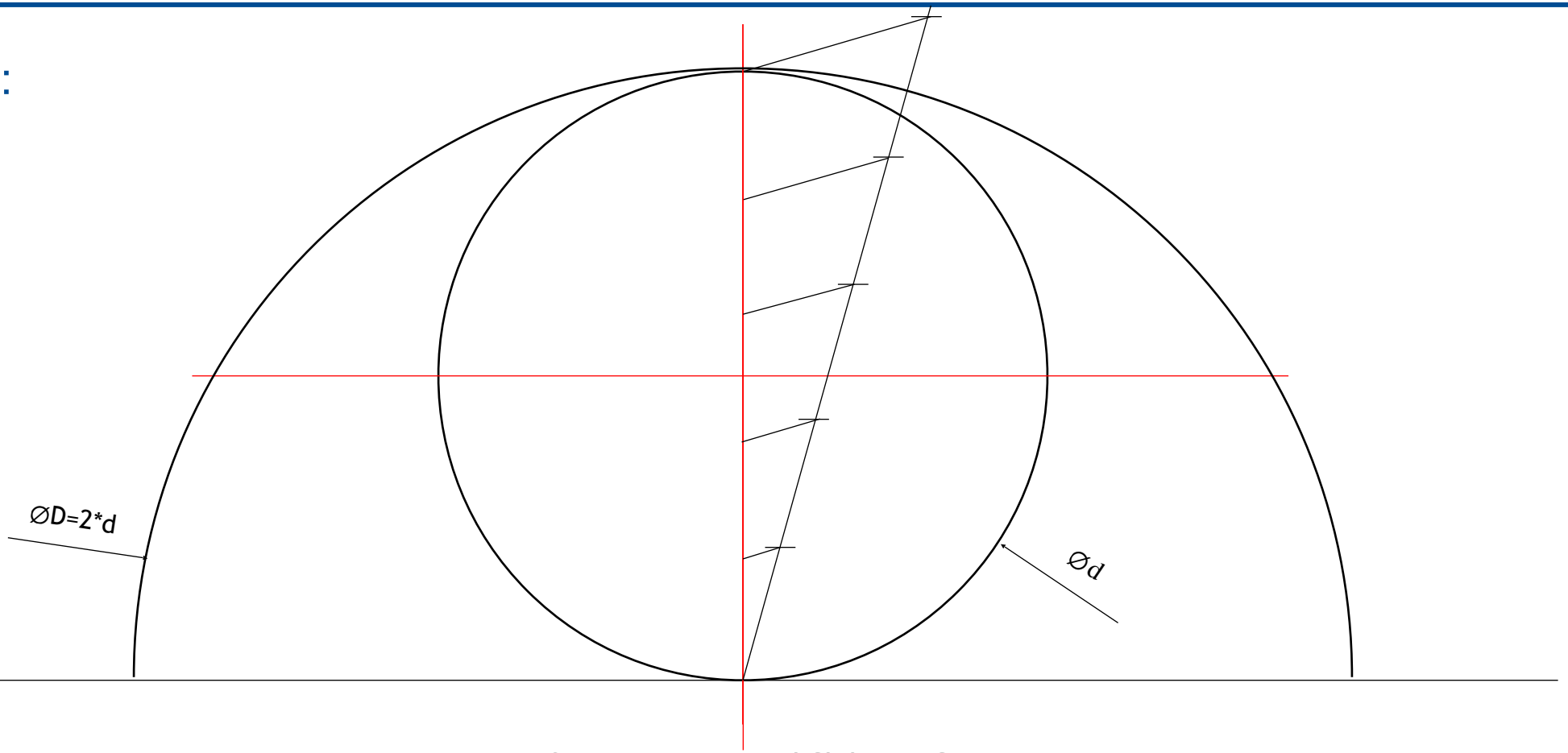
Solution:



Engineering Design: **Exercise 1**

Problem 1.5: Construct a regular pentagon into a circle with diameter d = 100 mm!

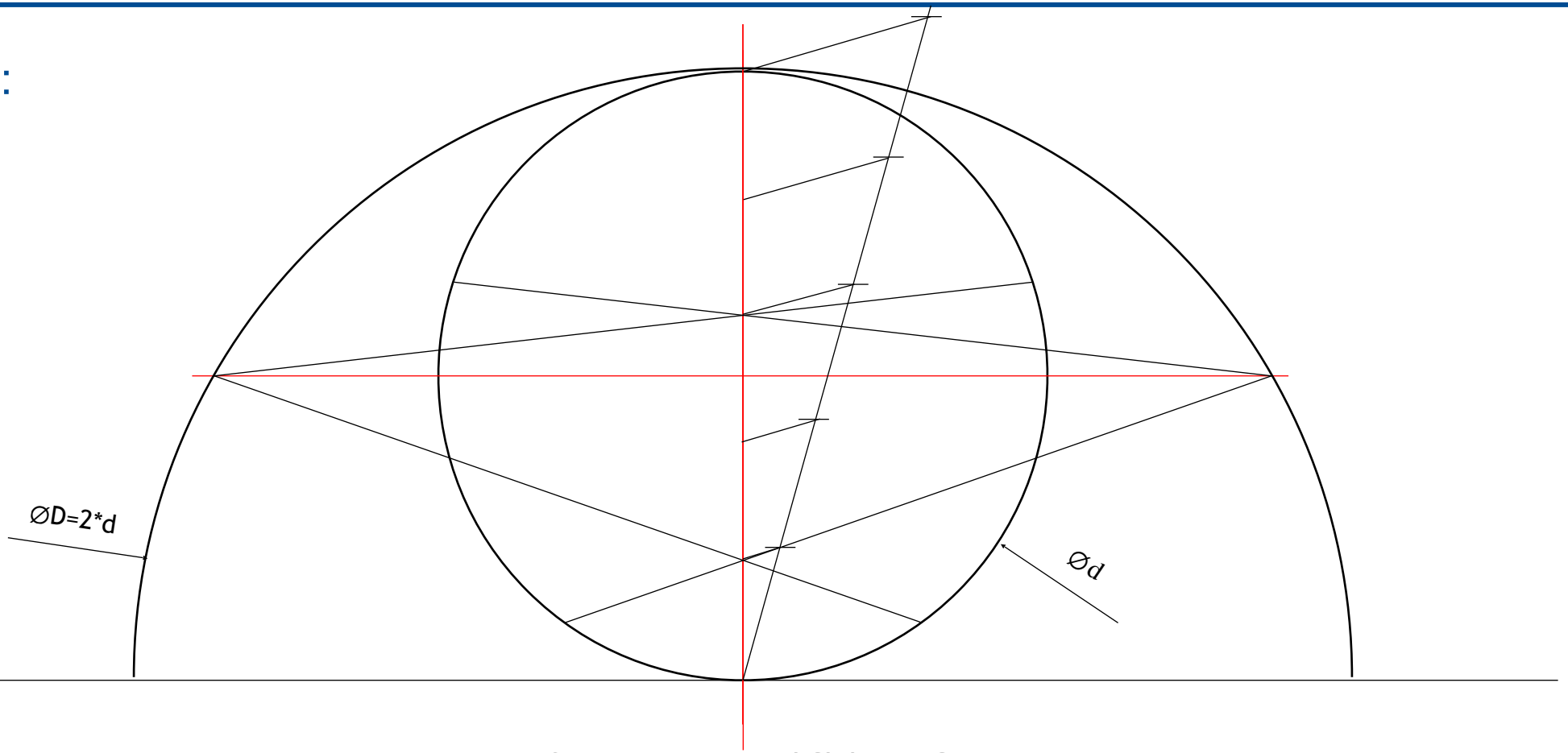
Solution:



Engineering Design: **Exercise 1**

Problem 1.5: Construct a regular pentagon into a circle with diameter d = 100 mm!

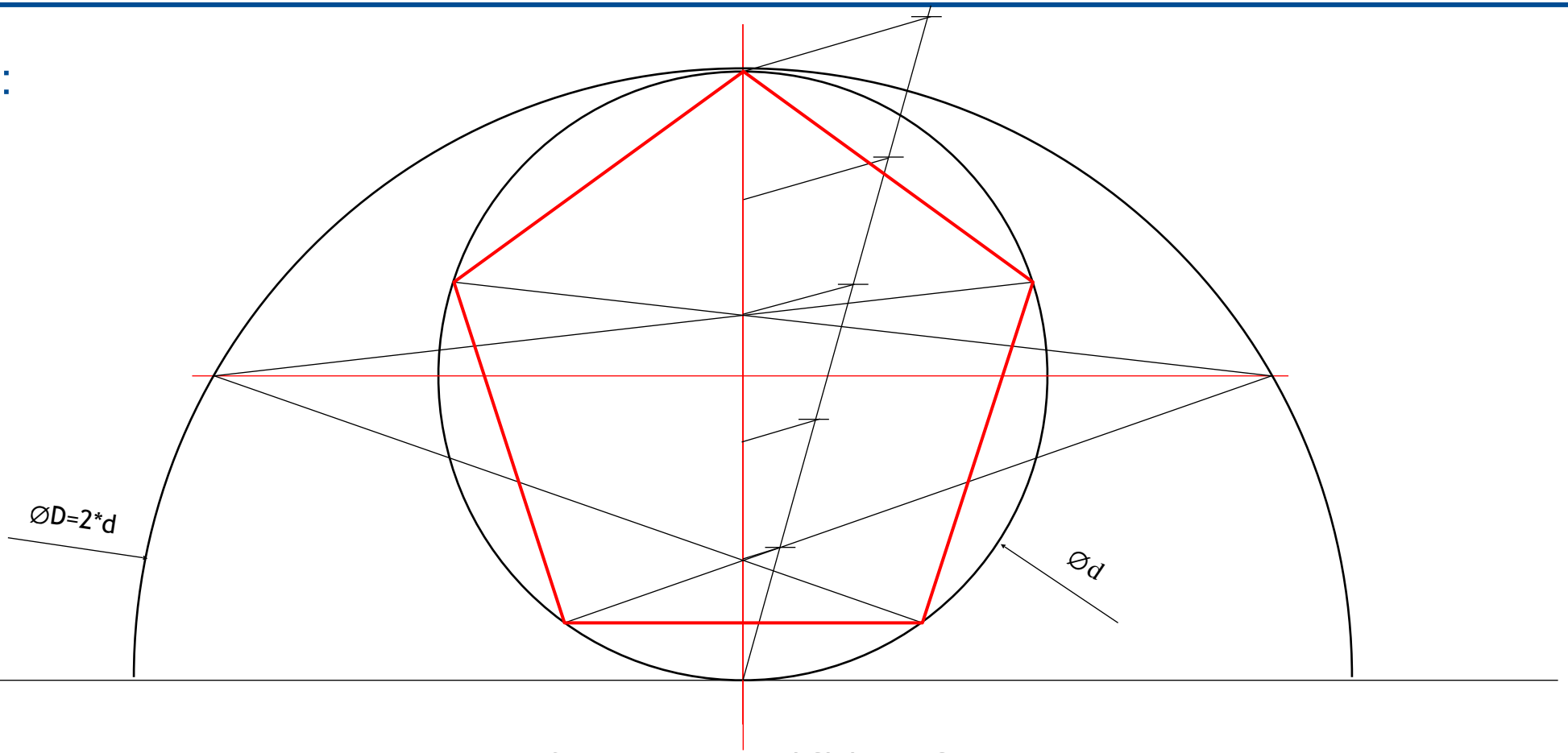
Solution:



Engineering Design: **Exercise 1**

Problem 1.5: Construct a regular pentagon into a circle with diameter d = 100 mm!

Solution:

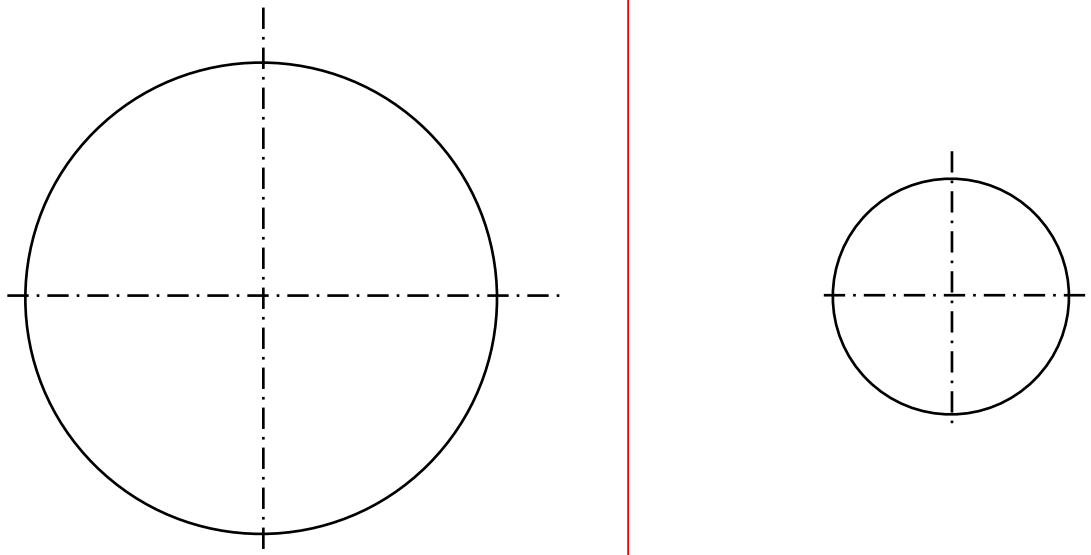


Engineering Design: **Exercise 1: Agenda**

0. Organization of Exercise
1. Exercise 1: Basic elements
    1. Bisecting line of an angle
    2. Bisector of to lines
    3. Rounding of an angle
    4. Tangent on circle
    5. Pentagon in circle
    6. Tangent on two circles

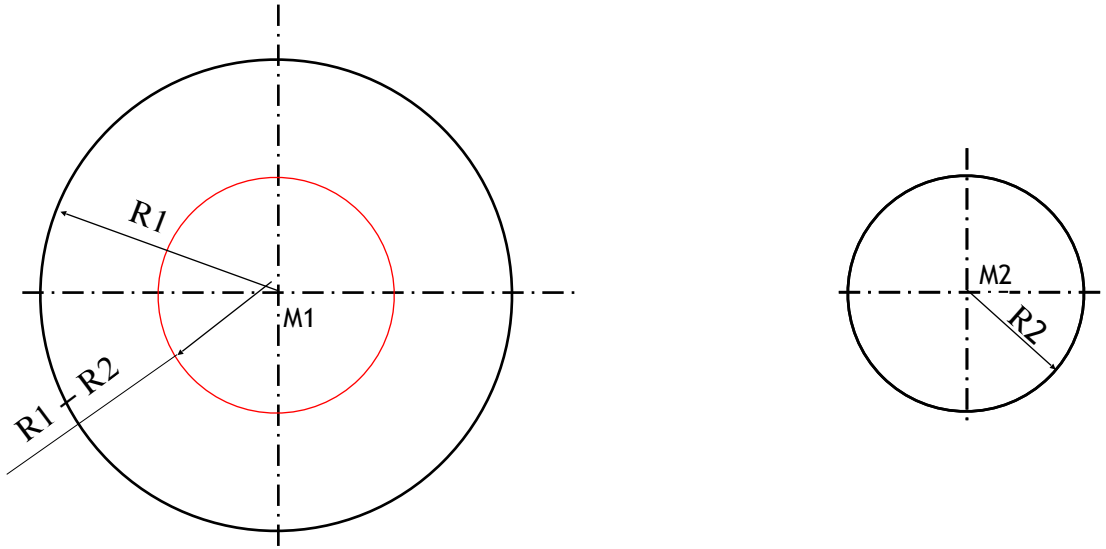
Engineering Design: **Exercise 1**

HOMEWORK 1.6: Construct both tnagents on two circles!



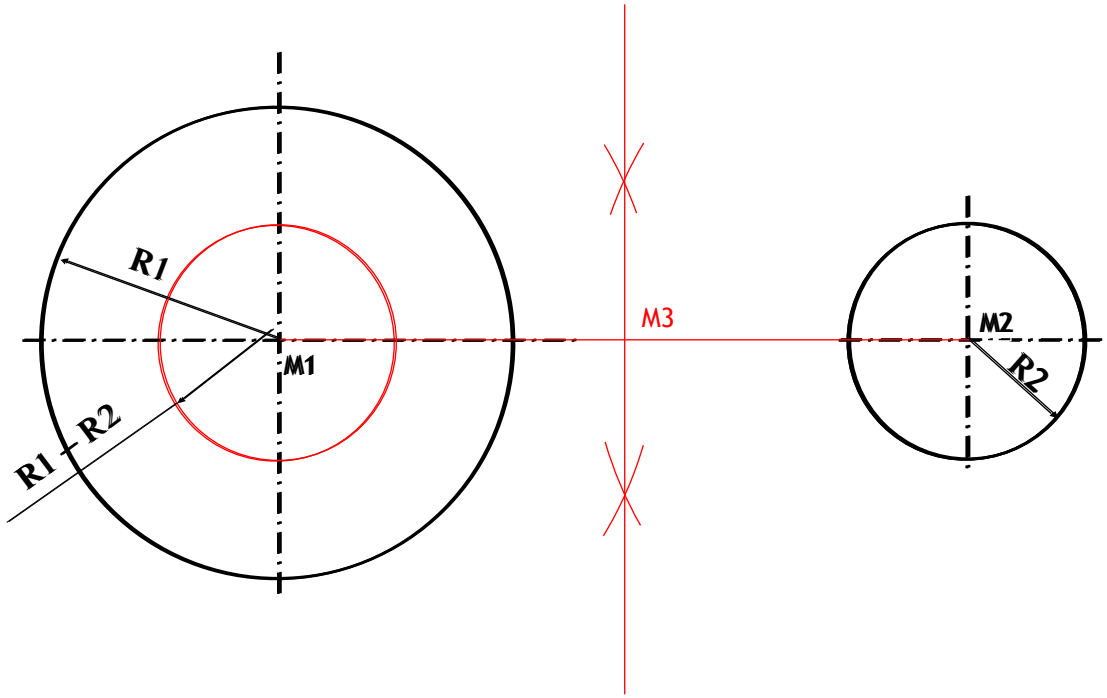
Engineering Design: **Exercise 1**

HOMEWORK 1.6: Construct both tnagents on two circles!



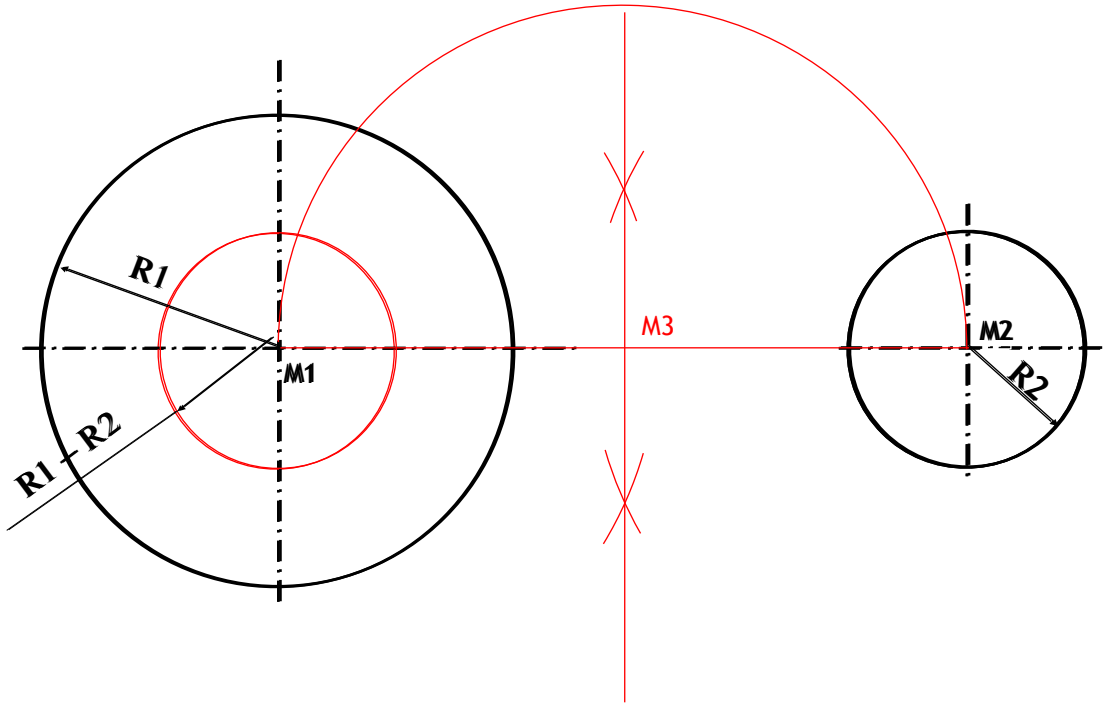
Engineering Design: **Exercise 1**

HOMEWORK 1.6: Construct both tnagents on two circles!



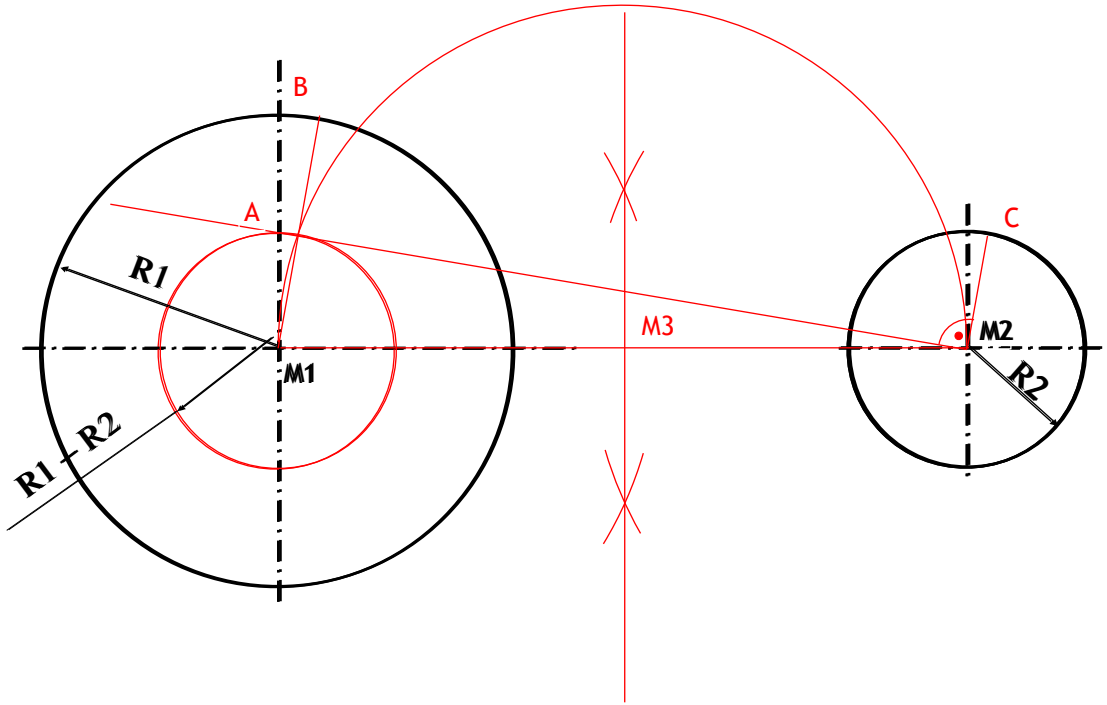
Engineering Design: **Exercise 1**

HOMEWORK 1.6: Construct both tnagents on two circles!



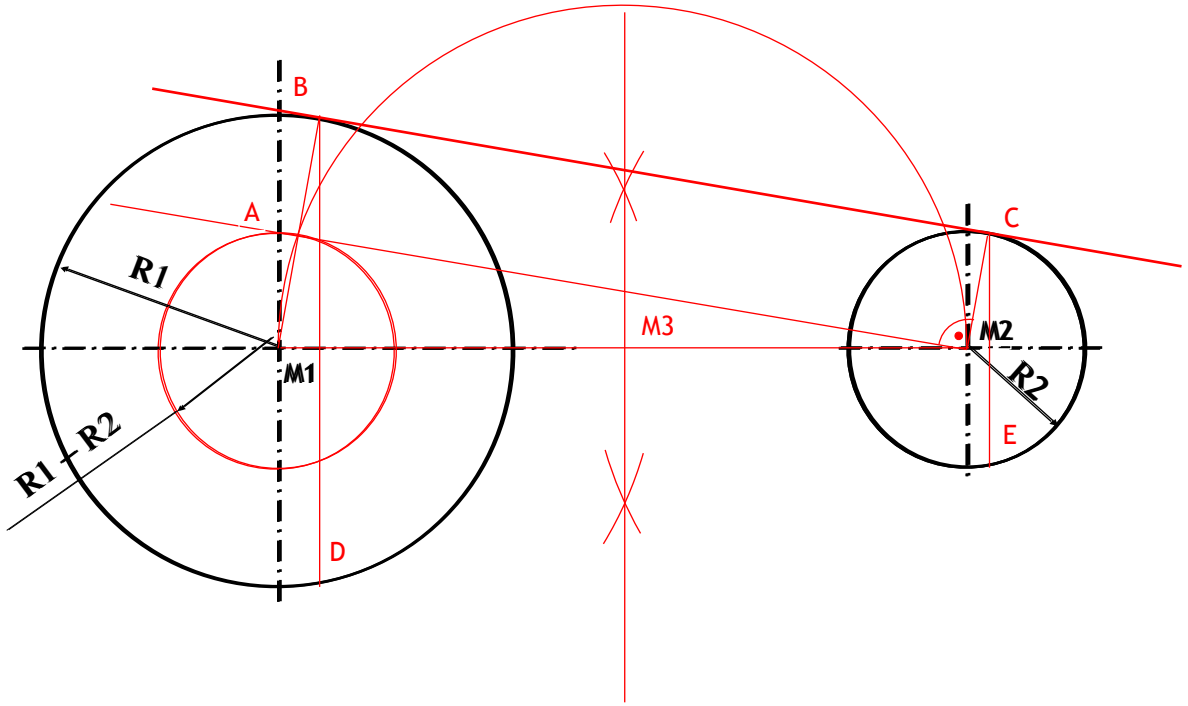
Engineering Design: **Exercise 1**

HOMEWORK 1.6: Construct both tnagents on two circles!



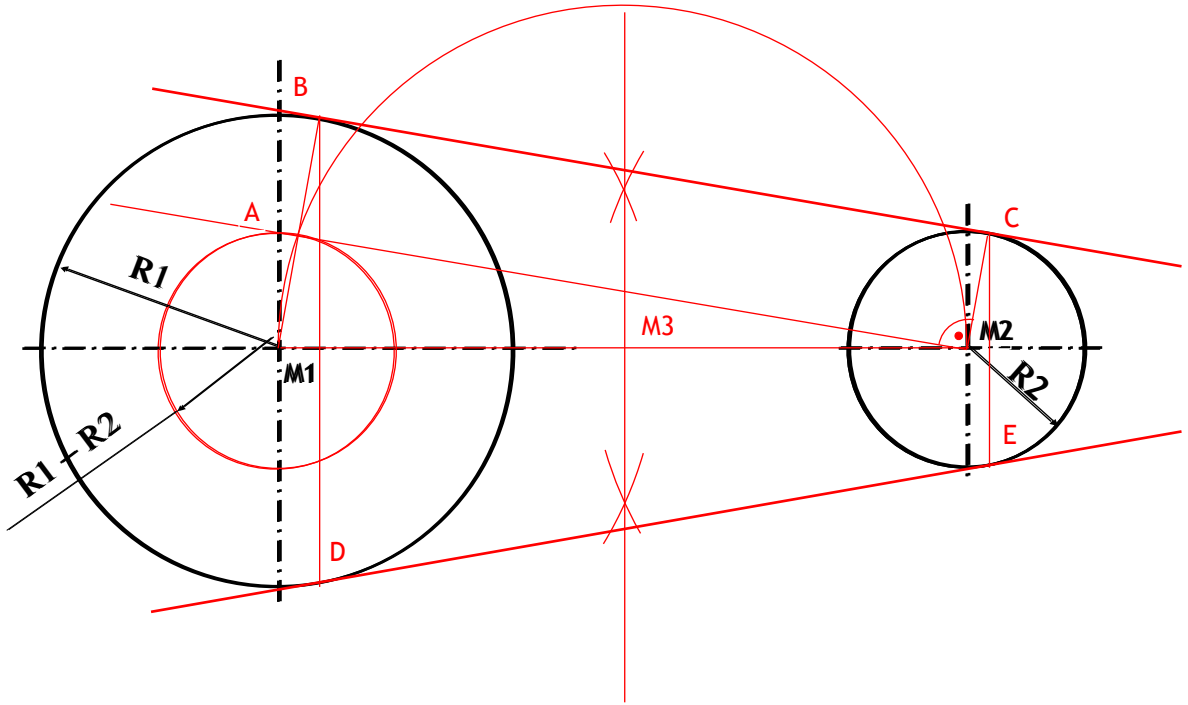
Engineering Design: **Exercise 1**

HOMEWORK 1.6: Construct both tnagents on two circles!



Engineering Design: **Exercise 1**

HOMEWORK 1.6: Construct both tnagents on two circles!



Engineering Design: Exercise 1
Additional Information

https://learning.oreilly.com/library/view/manual-of-engineering/9780080943626/content/kindle_split_14.html

Source: a. Nagarajah / F. Giesecke: Technical Drawing with Engineering Graphics