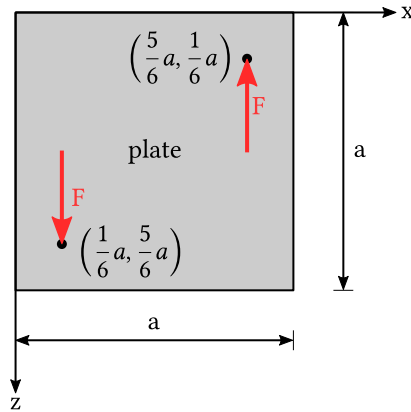


### Exercise 1: Forces and moments

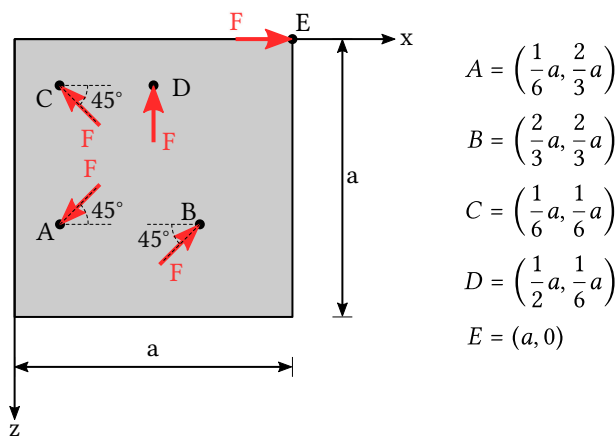
16.10.2023 - 20.10.2023

**Question 1** .....  
 The picture below shows a rigid plate. Two forces of equal magnitude  $F$  are applied in opposite direction at the indicated points.

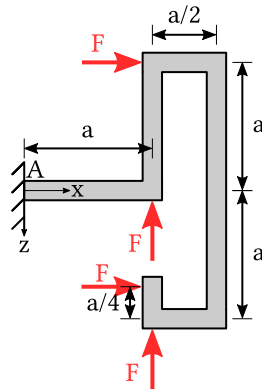


- (a) Is the system in static equilibrium?
- (b) If you find that the system is not in static equilibrium, then determine the forces that would need to be applied in order to achieve equilibrium!

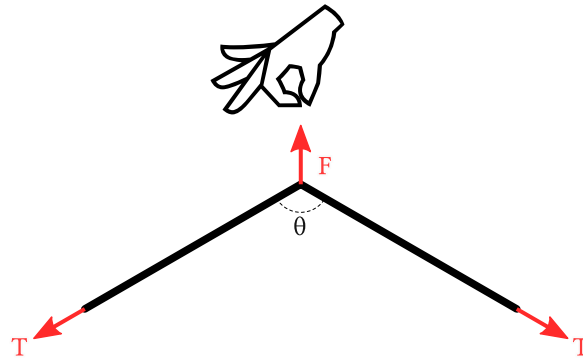
**Question 2** .....  
 The rigid plate shown below is subjected to five point forces at the indicated points. All forces have the same magnitude  $F$ , but their orientation differs. Find the resultant force and moment, and indicate them in the picture!



**Question 3** .....  
 A bar with multiple corners is fixed on a wall and loaded by four forces of magnitude  $F$ . Sort the forces according to the resulting bending moment about the  $y$ -axis in point  $A$ , from highest to lowest!



**Question 4** .....  
 A string is plucked with a force  $F$  at the middle of the string. Calculate the line tension  $T$  that needs to act in the string so that the system is in equilibrium!



**Question 5** .....  
 A rigid body of mass  $m$  is suspended from a system of pulleys in the gravitational field of earth (constant acceleration  $g$ ). Calculate the force  $F$  that you need to apply at the left end of the rope to hold the mass in position!

