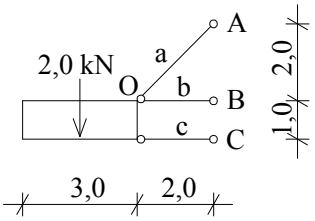
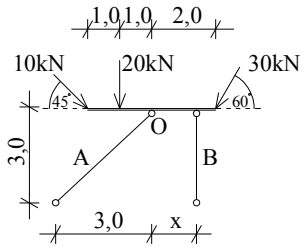
Solutions

1 A) Determine the forces of the three supporting bars. (Magnitude, tension or compression)



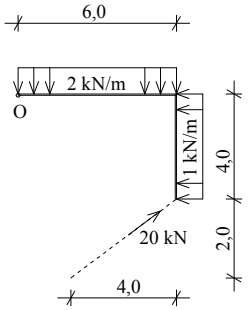
$\sum F_y = 0$	→	$A_y = 2{,}0$ kN↑	$A_x = 2{,}0$ kN →	A = 2,828 kN ↗ (tension)
$\sum M_O = 0$	→	$-2{,}0 \cdot 1{,}5 + C \cdot 1 = 0$		C = 3,0 kN ← (compression)
$\sum F_x = 0$	→			B = 1 kN → (tension)

2 A) The force system is in equilibrium. Find A, B, and x !



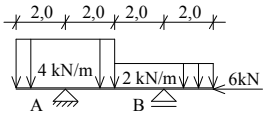
10 kN↘	→	7,07 kN↓	+	7,07 kN→	
30 kN↙	→	25,98kN↓	+	15 kN←	
$\sum F_x = 0$	→	$A_x = 7{,}93$ kN→		$A_y = 7{,}93$ kN↑	A = 14,14 kN↗ (compression)
$\sum F_y = 0$	→				B = 45,12 kN↑ (compression)
$\sum M_O = 0$	→	$-7{,}07 \cdot 2 - 20 \cdot 1 + 25{,}98 \cdot 2 - B \cdot x = 0$			x = 0,395 m

3 A) Determine the resultant of the given forces. (Magnitude, direction) Determine the distance of the resultant form point O.



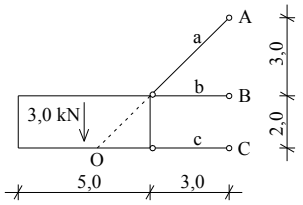
20 kN↗	→	8,95 kN↑	+	17,90 kN→	
$\sum F_x =$	R_x	= 13,9 kN→			
$\sum F_y =$	R_y	= 3,05kN↓	R =	14,23 kN↘	α = °
$\sum M_O = R_y \cdot x$	x =	81,3kNm / 3,05 kN = -26,66m			
$\sum M_O = R_x \cdot y$	y =	81,3kNm / 13,9 kN = +5,85m			

4 A) Determine the support reactions!



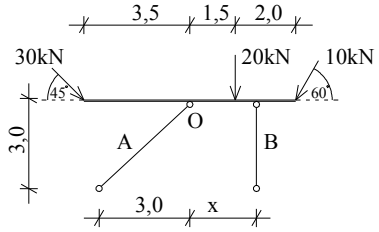
A_x=6kN→ A_y=16kN↑ B=8kN↑

1 B) Determine the forces of the three supporting bars. (Magnitude, sign)



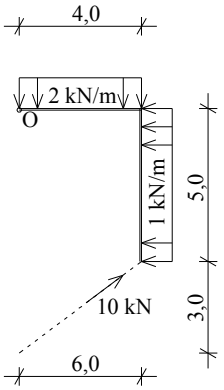
$\sum F_y = 0$	→	$A_y = 3{,}0$ kN↑	$A_x = 3{,}0$ kN →	A = 4,243 kN ↗ (tension)
$\sum M_O = 0$	→	$-3{,}0 \cdot 0{,}5 + B \cdot 2 = 0$		B = 0,75 kN) → (tension)
$\sum F_x = 0$	→			C = 3,75 kN ← (compression)

2 B) The force system is in equilibrium. Find A, B, and x !



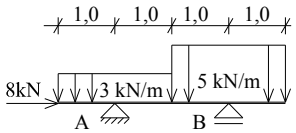
30 kN↘	→	21,21 kN↓	+	21,21 kN→	
10 kN↙	→	8,66 kN↓	+	5 kN←	
$\sum F_x = 0$	→	$A_x = 16{,}21$ kN←		$A_y = 16{,}21$ kN↓	A = 14,14 kN↙ (tension)
$\sum F_y = 0$	→				B = 66,08 kN↑ (compression)
$\sum M_O = 0$	→	$-21{,}21 \cdot 3{,}5 + 20 \cdot 1{,}5 + 8{,}66 \cdot 3{,}5 - B \cdot x = 0$			x = 0,21 m

3 B) Determine the resultant of the given forces. (Magnitude, direction) Determine the distance of the resultant form point O.



10 kN↗	→	4,47 kN↑	+	8,94 kN→	
$\sum F_x =$	R_x	= 3,94 kN→			
$\sum F_y =$	R_y	= 3,53 kN↓	R =	5,29 kN↘	α = °
$\sum M_O = R_y \cdot x$	x =	34,08 kNm / 3,53 = -9,65m			
$\sum M_O = R_x \cdot y$	y =	34,08 kNm / 3,94 = +8,65 m			

4 B) Determine the support reactions!



A_x=8kN← A_y=6kN↑ B=10kN↑