

MAK 101 Makine Mühendisliğine Giriş

Makine ve Yapılardaki Kuvvetler

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Kuvvet Birimleri

TABLE 3.1
Conversion Factors between USCS and SI Units for Force

lb	oz	N
1	16	4.448
0.0625	1	0.2780
0.2248	3.597	1

Kartezyen ve Kutupsal Koordinatlarda Kuvvet Vektörü

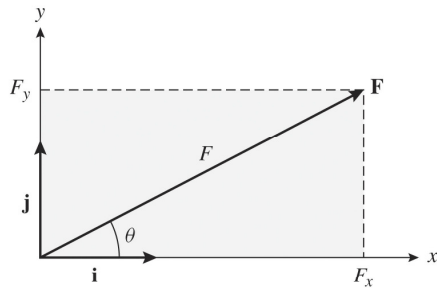
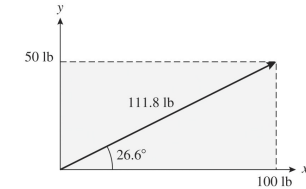
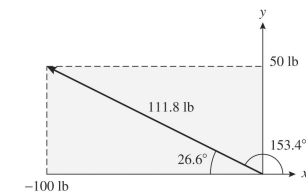


FIGURE 3.3

Representing a force vector in terms of its rectangular components (F_x , F_y), and its polar components (F , θ).



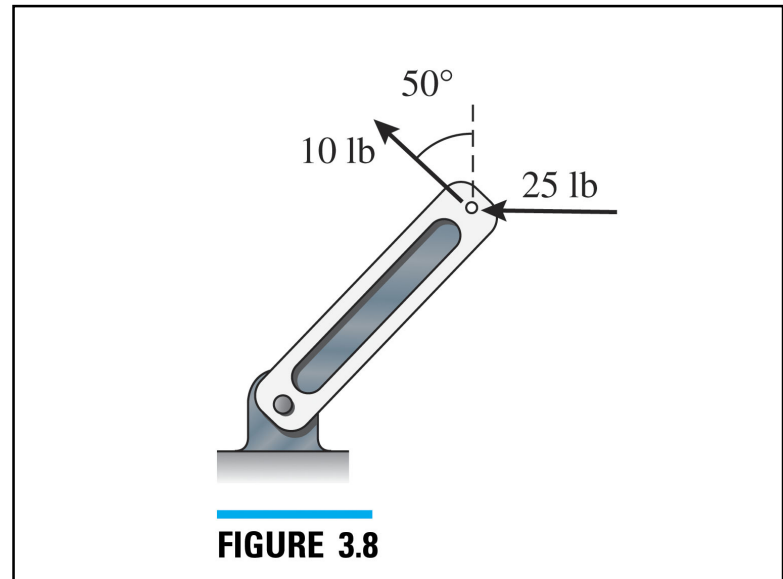
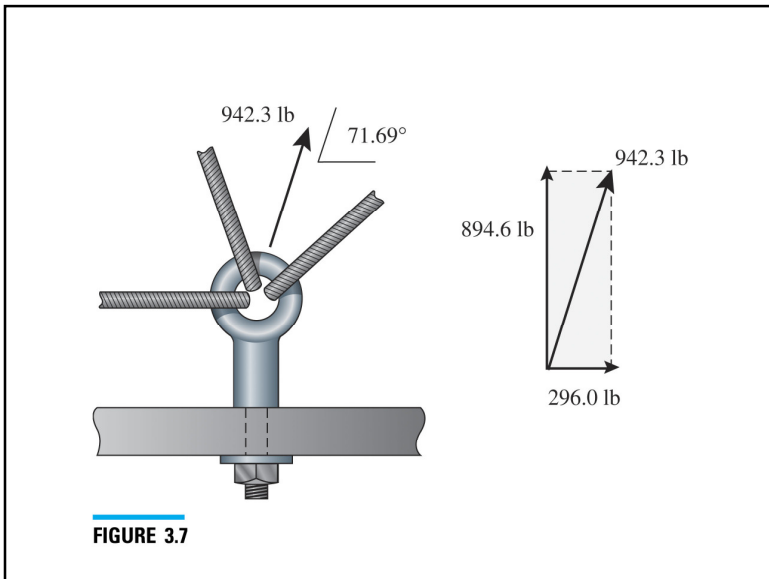
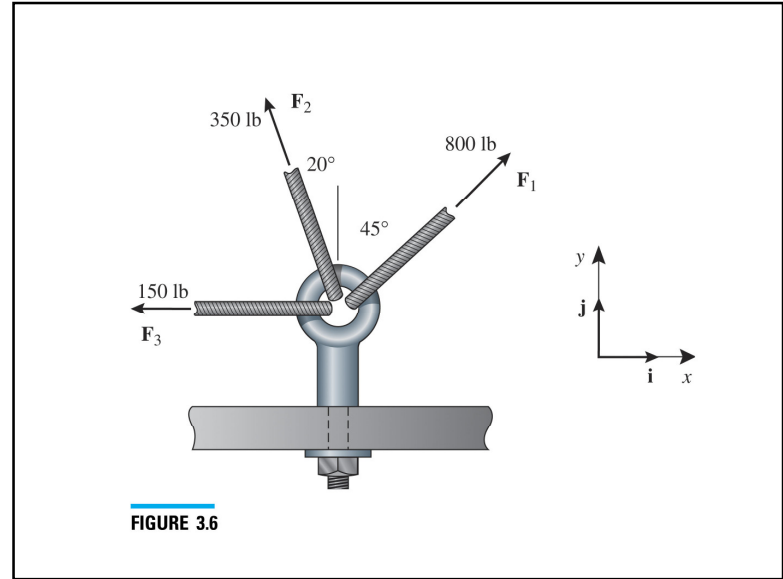
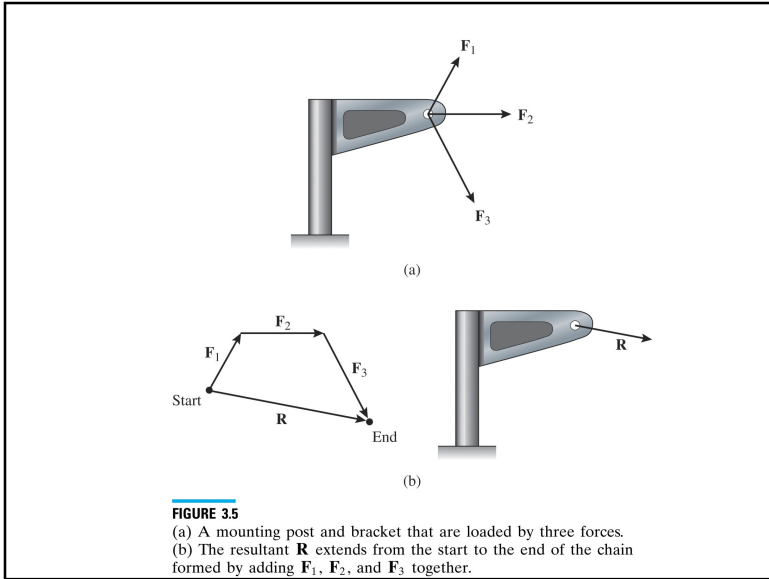
(a)

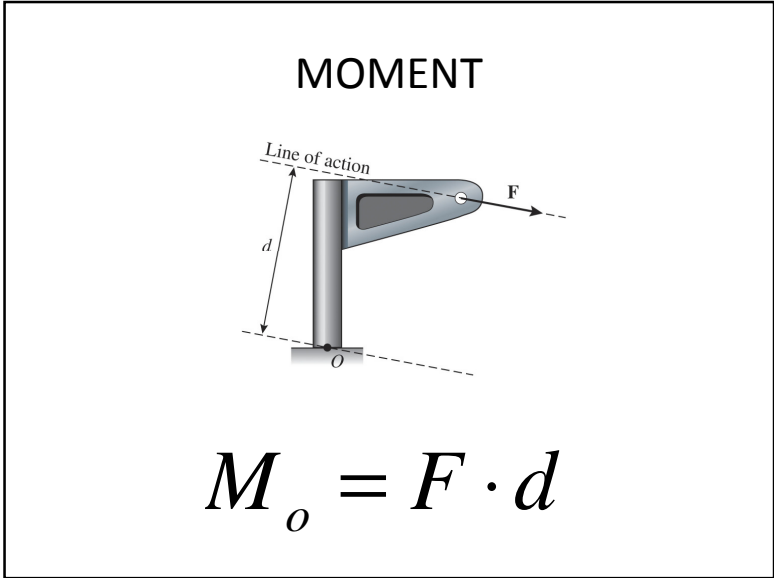
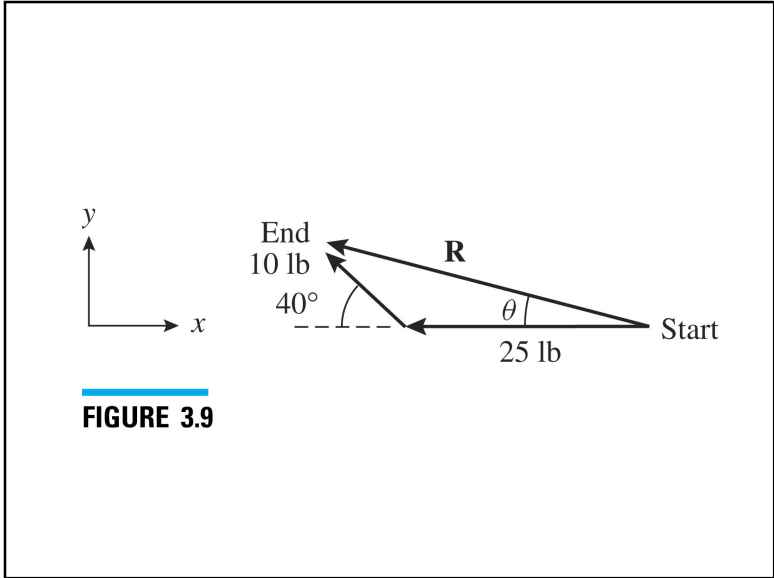


(b)

FIGURE 3.4

Determining the angle of action for a force that (a) lies in the first quadrant and (b) lies in the second quadrant.

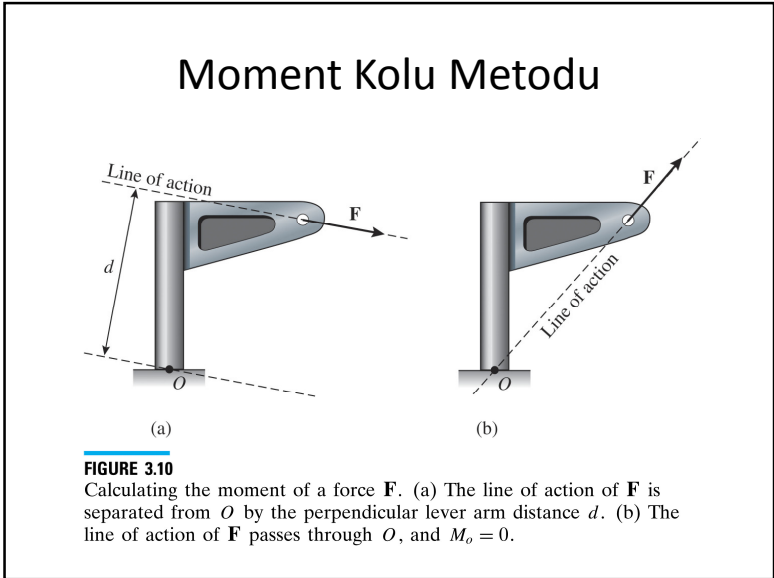




Moment birimleri

TABLE 3.2
Conversion Factors between USCS and SI Units for Moment or Torque

	in · lb	ft · lb	N · m
1	1	0.0833	0.1130
12	12	1	1.356
8.851	8.851	0.7376	1



Moment Komponentleri Metodu

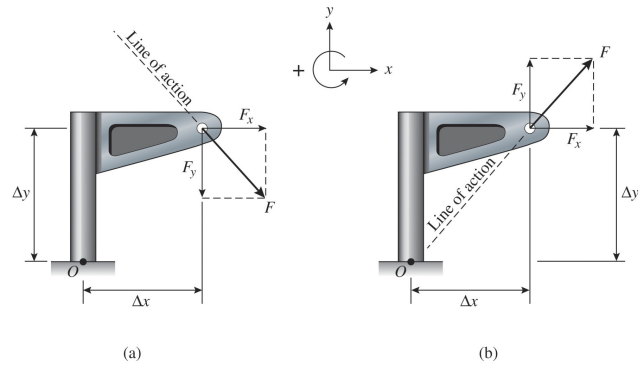


FIGURE 3.11

(a) Both F_x and F_y create clockwise moments about point O . (b) F_x exerts a clockwise moment, but F_y exerts a counterclockwise moment.

Örnek

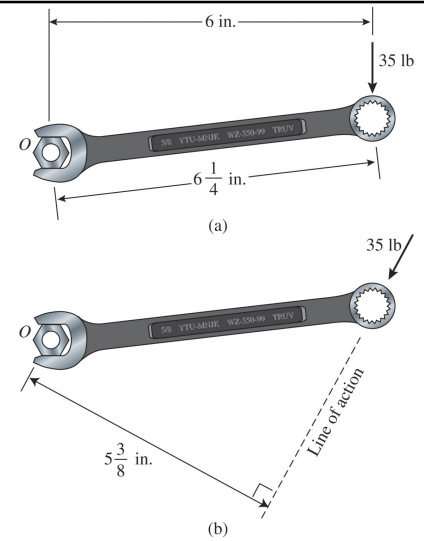


FIGURE 3.12

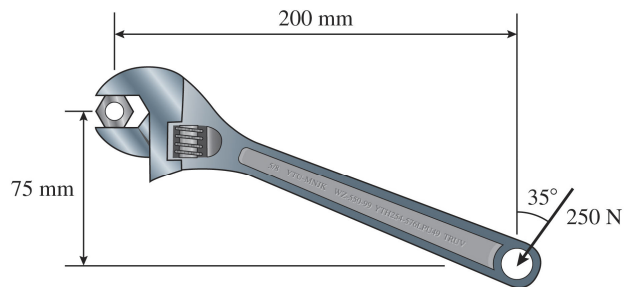


FIGURE 3.13

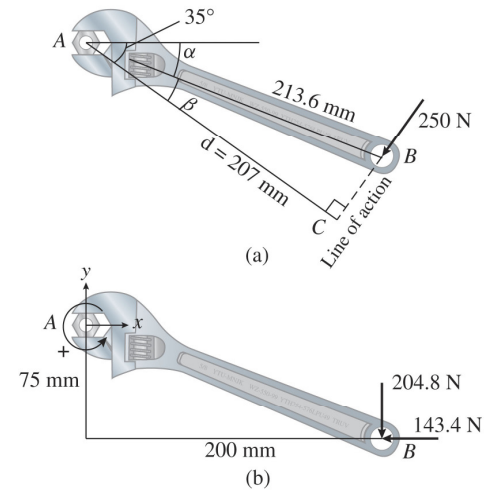


FIGURE 3.14

Kuvvet ve Moment Dengesi

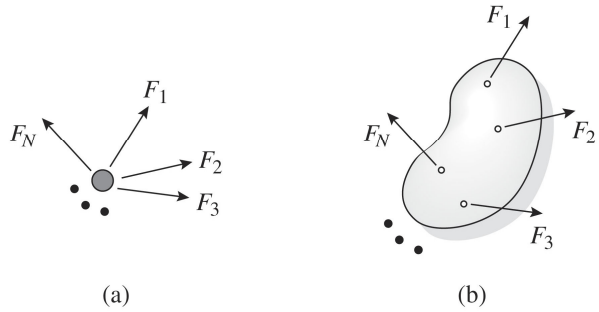


FIGURE 3.15
A schematic of N forces acting on (a) a single particle and (b) a rigid body.

Serbest Cisim Diyagramları

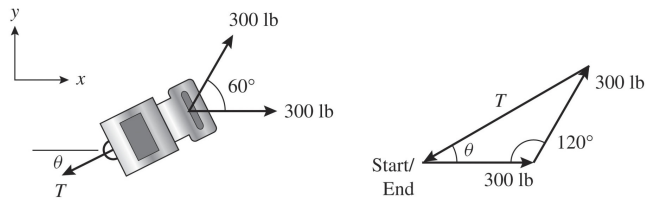
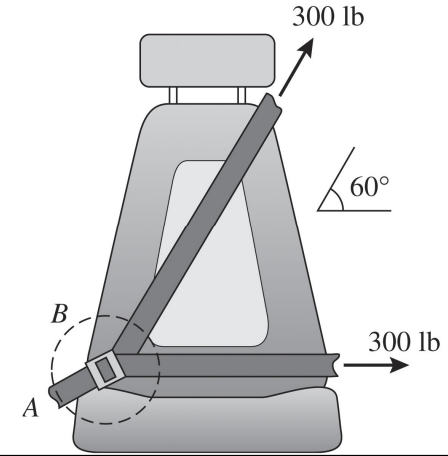


FIGURE 3.18

Örnek

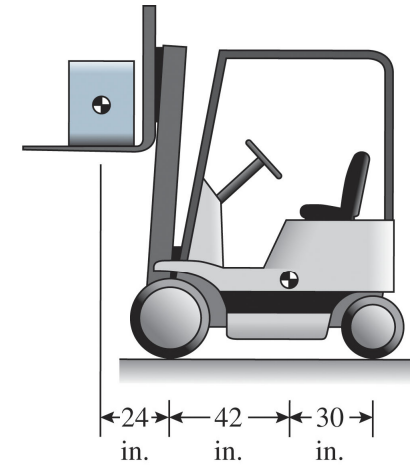


FIGURE 3.21

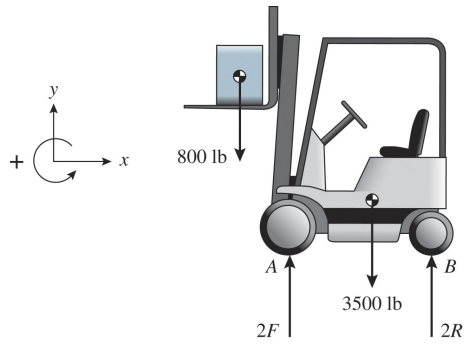


FIGURE 3.22

TABLE 3.3
Quantities,
Symbols, and
Units that Arise
when Analyzing
Forces in
Structures and
Machines

Quantity	Conventional Symbols	Conventional Units	
		USCS	SI
Force vector	\mathbf{F}	lb	N
Force components	$F_x, F_y, F_{x,i}, F_{y,i}$	lb	N
Force magnitude	F	lb	N
Force direction	θ	deg, rad	deg, rad
Resultant	\mathbf{R}, R, R_x, R_y	lb	N
Moment about O	$M_o, M_{o,i}$	in · lb, ft · lb	N · m
Perpendicular lever arm	d	in., ft	m
Moment component offset	$\Delta x, \Delta y$	in., ft	m

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