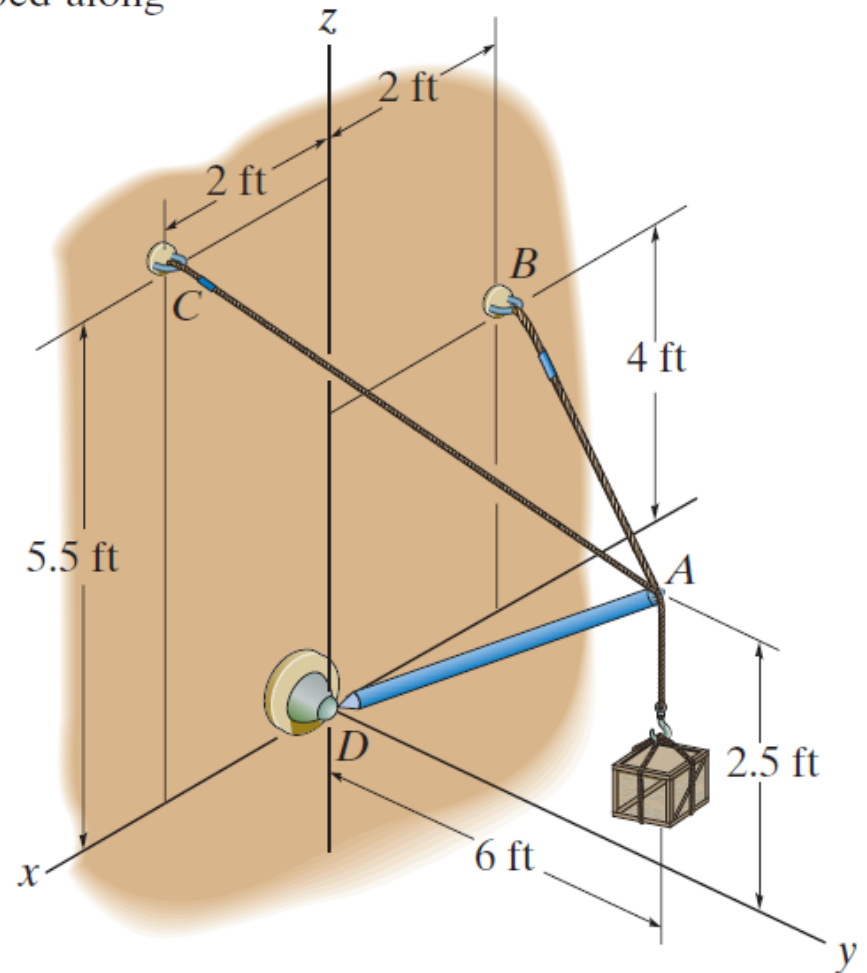# ENGR 057 Statics and Dynamics

Problems pre-exam 1

Summer 2022

If the tension developed in each of the cables cannot exceed 300 lb, determine the largest weight of the crate that can be supported. Also, what is the force developed along strut AD?
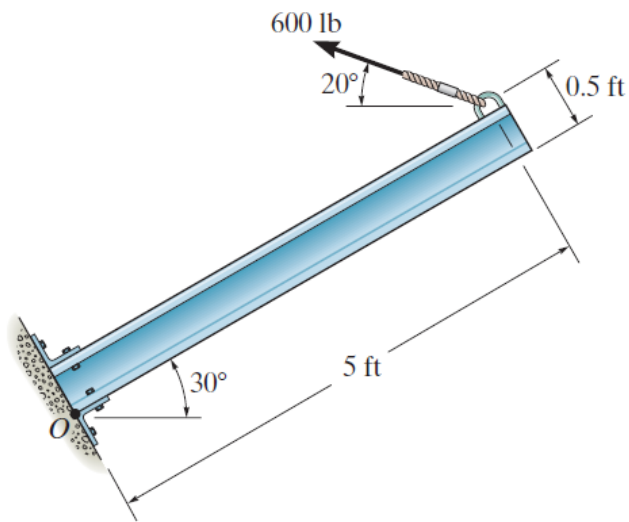

Ans:

$F_{AD} = 557$ lb

$W = 407$ lb

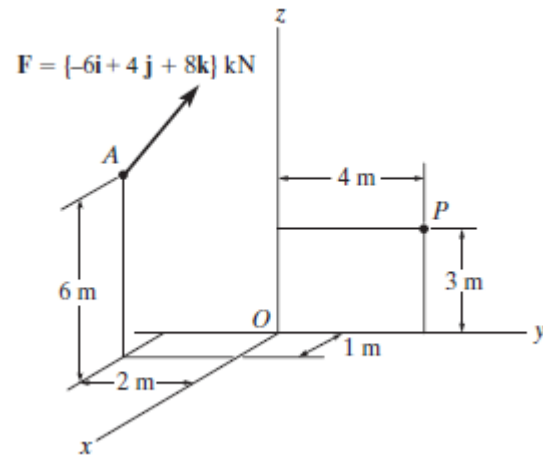Determine the moment of the force about point *O*.

600 lb

20°

0.5 ft

30°

5 ft

O

Ans:

M_o = 2490 lb.ft

counterclockwise

Determine the moment of the force **F** about point *P*. Express the result as a Cartesian vector.

$F = \{-6i + 4j + 8k\}$ kN

Ans:

$M_P = \{-60i - 26j - 32k\}$ kN. m

Determine the length b of the triangular load and its position a on the beam such that the equivalent resultant force is zero and the resultant couple moment is $8 \text{ kN} \cdot \text{m}$ clockwise.
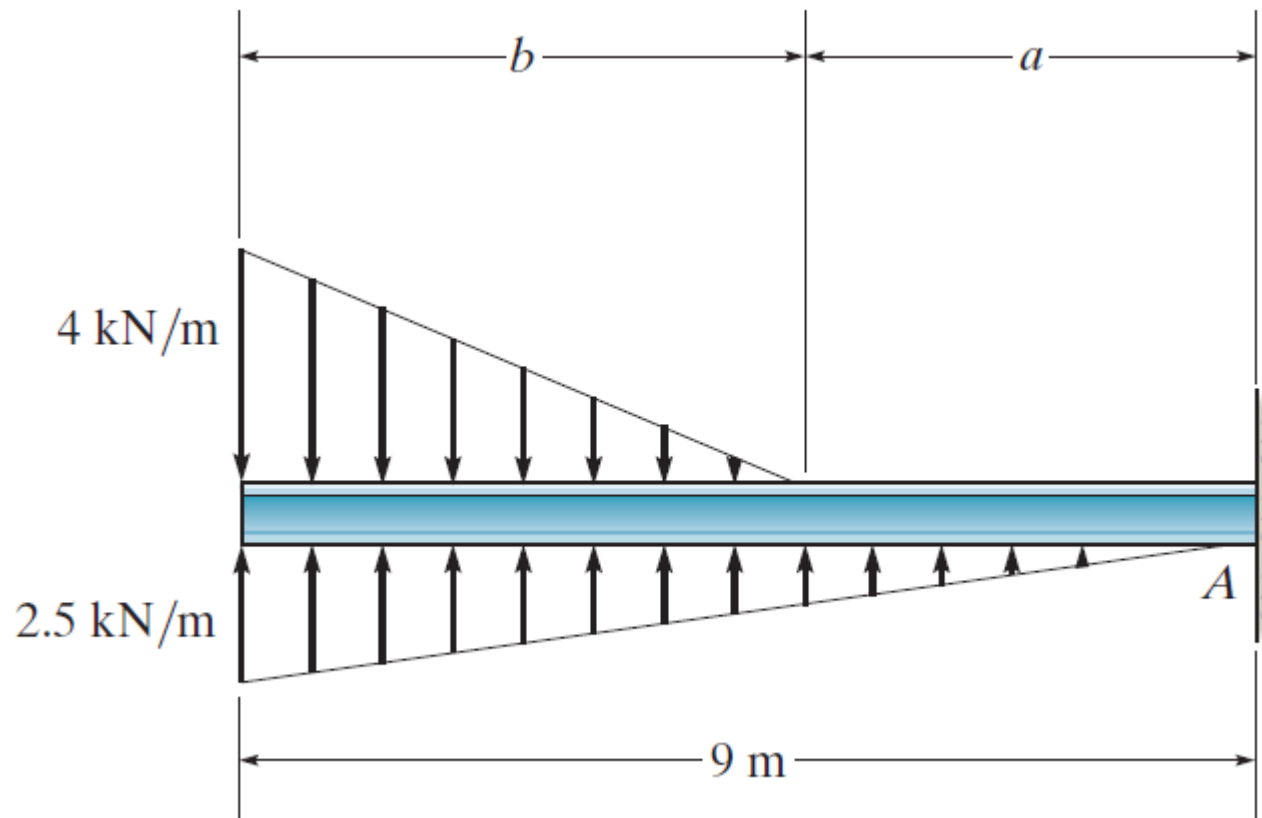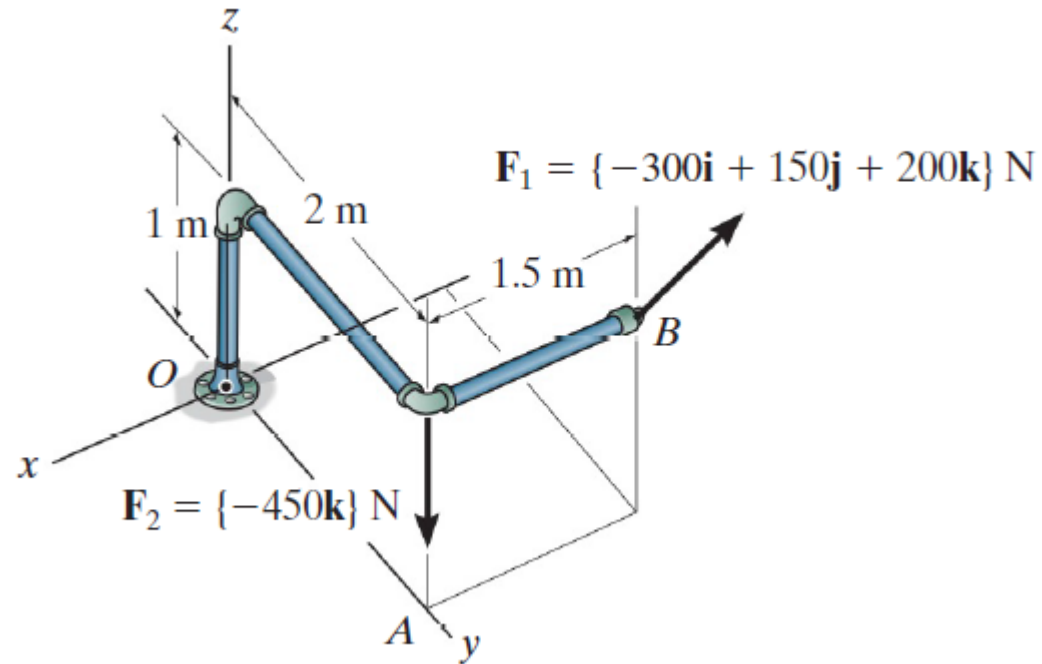

Ans:

$a = 1.54 \text{ m}$

$b = 5.625 \text{ m}$

Replace the loading system by an equivalent resultant force and couple moment acting at point O.

$F_1 = \{-300i + 150j + 200k\}$ N

1 m 2 m

1.5 m

B

O

x

$F_2 = \{-450k\}$ N

A y

z

Ans:

$(M_R)_O = r_{OB} \times F_1 + r_{OA} \times F_2 = \{-650i + 375k\}$ N.m