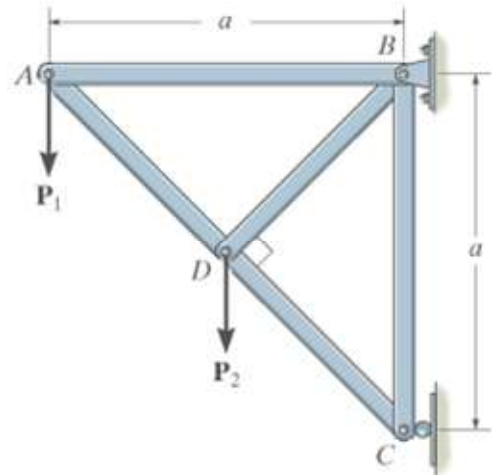# Homework Chapter 5

Problem 5-1: Determine the force in each member of the truss and state if the members are in tension or compression.

Given:

$P_1 = 7$ kN

$P_2 = 7$ kN

Problem 5-2: Determine the force in each member of the truss and state if the members are in tension or compression.
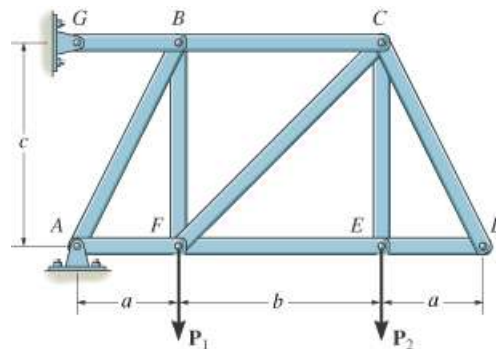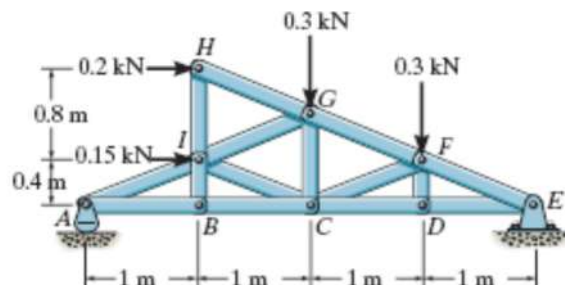
Given:

$P_1 = 0$ kN

$P_2 = 20$ kN

$a = 2$ m

$b = 4$ m

$c = 4$ m

Problem 5-3: Determine the force in each member of the truss and state if the members are in tension or compression.

Problem 5-4: Determine the force members *BC, FC*, and *FE*, and state if the members are in tension or compression.
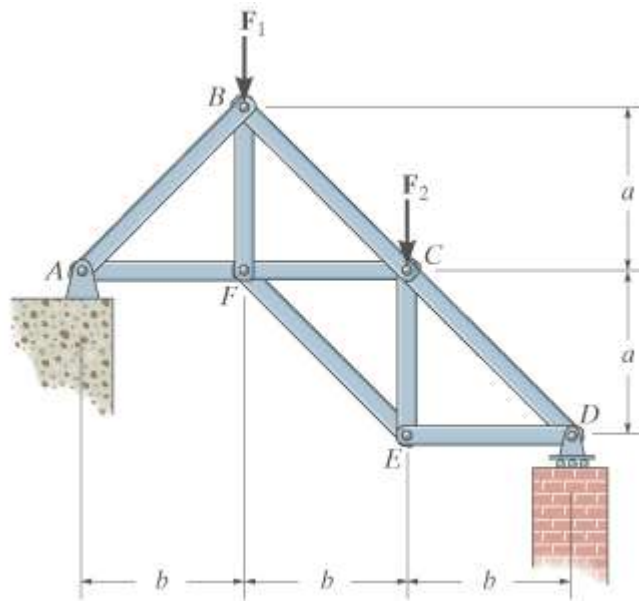
Given:

$F_1 = 6 \text{ kN}$
$F_2 = 6 \text{ kN}$
$a = 3 \text{ m}$
$b = 3 \text{ m}$

Problem 5-5: Determine the force in members *JE* and *GF* of the truss and state if these members are in tension or compression. Also, indicate all zero-force members.

Given:

$F_1 = 6 \text{ kN}$
$F_2 = 6 \text{ kN}$
$a = 1.5 \text{ m}$
$b = 2 \text{ m}$

Problem 5-6: Determine the force in members *CD* and *GF* of the truss and state if the members are in tension or compression. Also indicate all zero-force members.
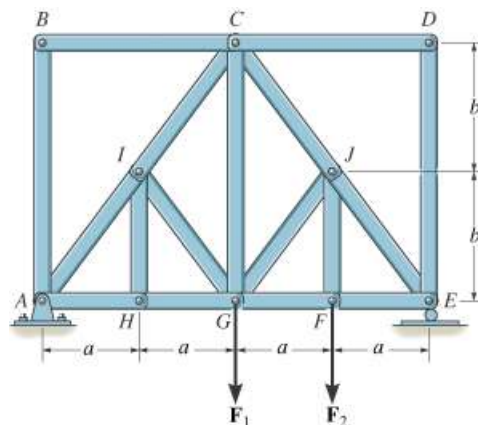
Given:

$F_1 = 1.5 \text{ kN}$
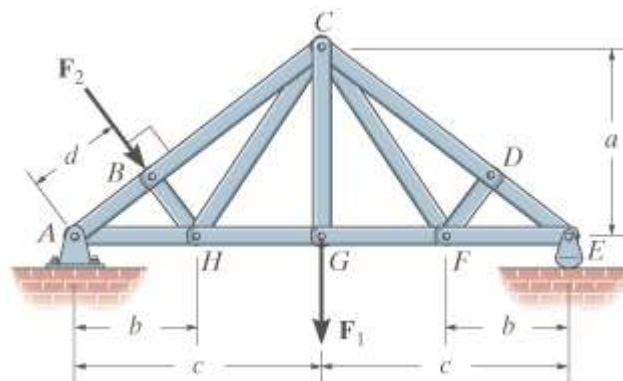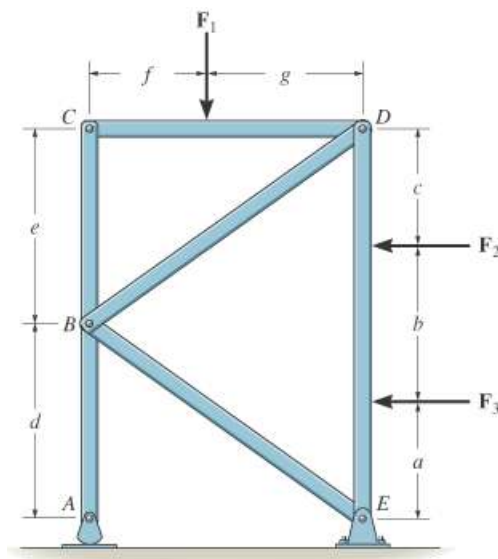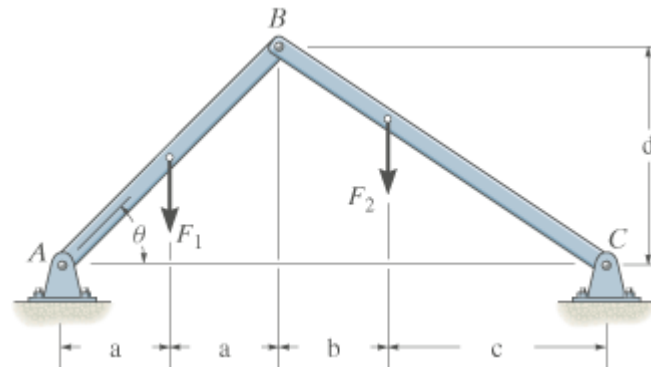$F_2 = 2 \text{ kN}$
$a = 1.5 \text{ m}$
$b = 1 \text{ m}$
$c = 2 \text{ m}$
$d = 0.8 \text{ m}$

Problem 5-7: Determine the horizontal and vertical components of force that pins *A* and *C* exert on the frame.

Given:

$F_1 = 1 \text{ kN}$

$F_2 = 500 \text{ N}$

$a = 0.2 \text{ m}$

$b = 0.2 \text{ m}$

$c = 0.4 \text{ m}$

$d = 0.4 \text{ m}$

$\theta = 45°$

Problem 5-8: Determine the horizontal and vertical components of force which the pins at *A*, *B*, and *C* exert on member *ABC* of the frame.

Given:

$F_1 = 400 \text{ N}$

$F_2 = 300 \text{ N}$

$F_3 = 300 \text{ N}$

$a = 1.5 \text{ m}$

$b = 2 \text{ m}$

$c = 1.5 \text{ m}$

$d = 2.5 \text{ m}$

$e = 2.5 \text{ m}$

$f = 1.5 \text{ m}$

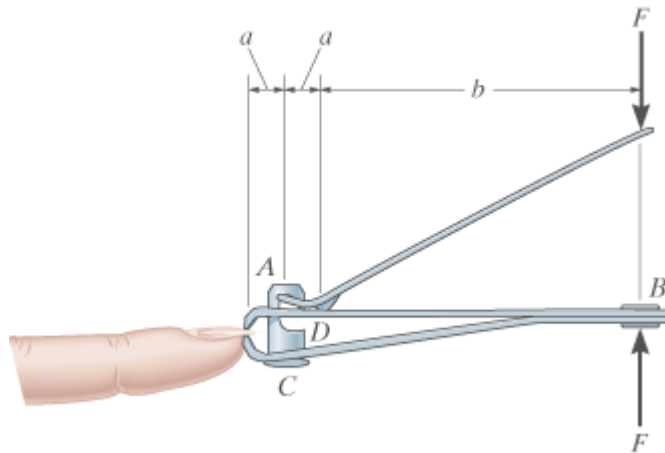$g = 2 \text{ m}$

$e = a + b + c - d$

Problem 5-9: The nail cutter consists of the handle and the two cutting blades. Assuming the blades are pin connected at B and the surface at D is smooth, determine the normal force on the fingernail when a force of **F** is applied to the handles as shown. The pin AC slides through a smooth hole at A and is attached to the bottom member at C.

Given:

$F = 5$ N

$a = 6$ mm

$b = 36$ mm

Problem 5-10: A force **P** is applied to the handles of the pliers. Determine the force developed on the smooth bolt B and the reaction that pin A exerts on its attached members.

Given:

$P = 40$ N

$a = 31.25$ mm

$b = 75$ mm

$c = 37.5$ mm