



A truss assembly has two forces P_1 and P_2 acting on joint C and D and is supported by two pins on A and B . Determine the reaction forces in the pin supports as well as the internal force in each member. Assume members are pin connected and member mass is negligible.

Find the magnitude of the reaction forces on A and B .

Member AD is a two force member.

$$\Rightarrow A_y = 0$$

$$+ \uparrow \Sigma F_y = 0 \rightarrow B_y - P_1 = 0$$

$$\Rightarrow B_y = P_1$$

$$\Sigma M_A = 0 \rightarrow d_1 \cdot P_1 - d_2 \cdot B_x = 0$$

$$\Rightarrow B_x = \frac{d_1}{d_2} P_1$$

$$+ \rightarrow \Sigma F_x = 0 \rightarrow A_x + B_x + P_2 = 0$$

$$\Rightarrow A_x = -\frac{d_1}{d_2} P_1 - P_2$$

Determine the magnitude of the internal force in each member. Identify if the force is tensile, compressive, or neither.

Assume tensile forces are positive.

$$+ \rightarrow \Sigma C_x = 0$$

$$\Rightarrow F_{BC} = 0$$

$$+ \uparrow \Sigma C_y = 0 \rightarrow -F_{CD} - P_1 = 0$$

$$\Rightarrow F_{CD} = -P_1$$

$$+ \rightarrow A_x = 0 \rightarrow A_x - F_{AD} = 0 \rightarrow F_{AD} = A_x$$

$$\Rightarrow F_{AD} = -\frac{d_1}{d_2} P_1 - P_2$$

$$+ \rightarrow \Sigma B_x = 0 \rightarrow B_x - \frac{d_1}{\sqrt{d_1^2 + d_2^2}} F_{BD} = 0 \rightarrow F_{BD} = \frac{\sqrt{d_1^2 + d_2^2}}{d_1} B_x$$

$$\Rightarrow F_{BD} = \frac{\sqrt{d_1^2 + d_2^2}}{d_2} P_1$$