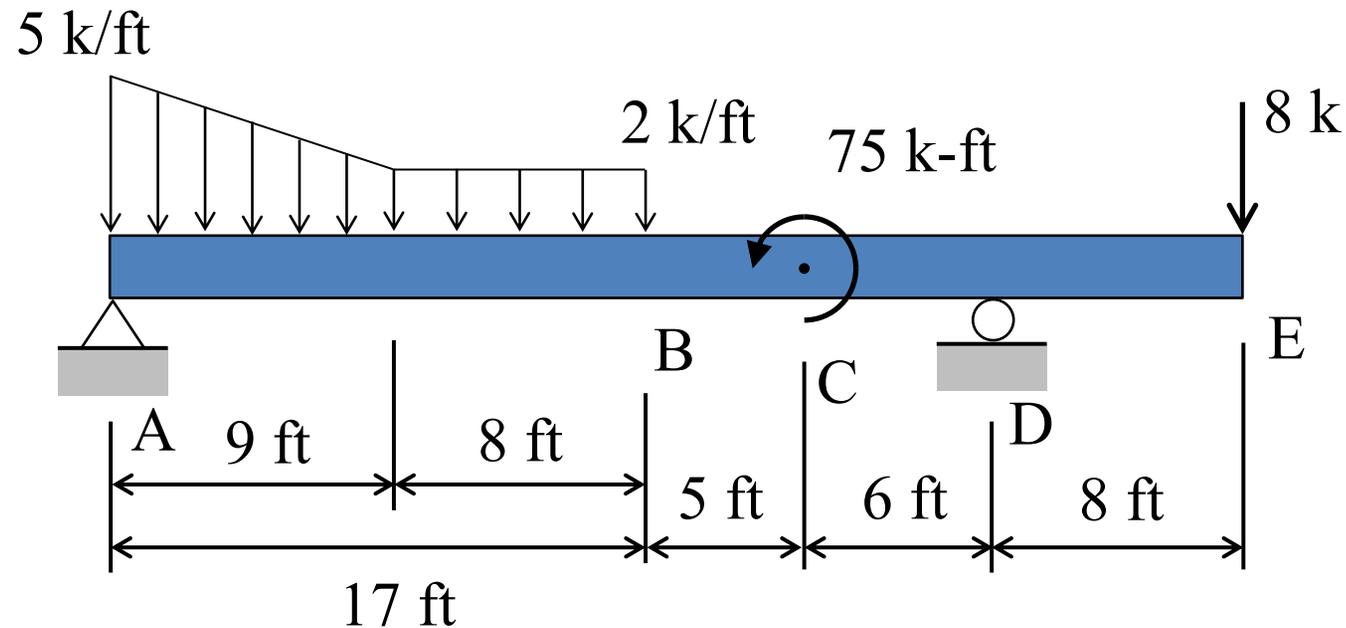


Distributed Load Example

Steven Vukazich

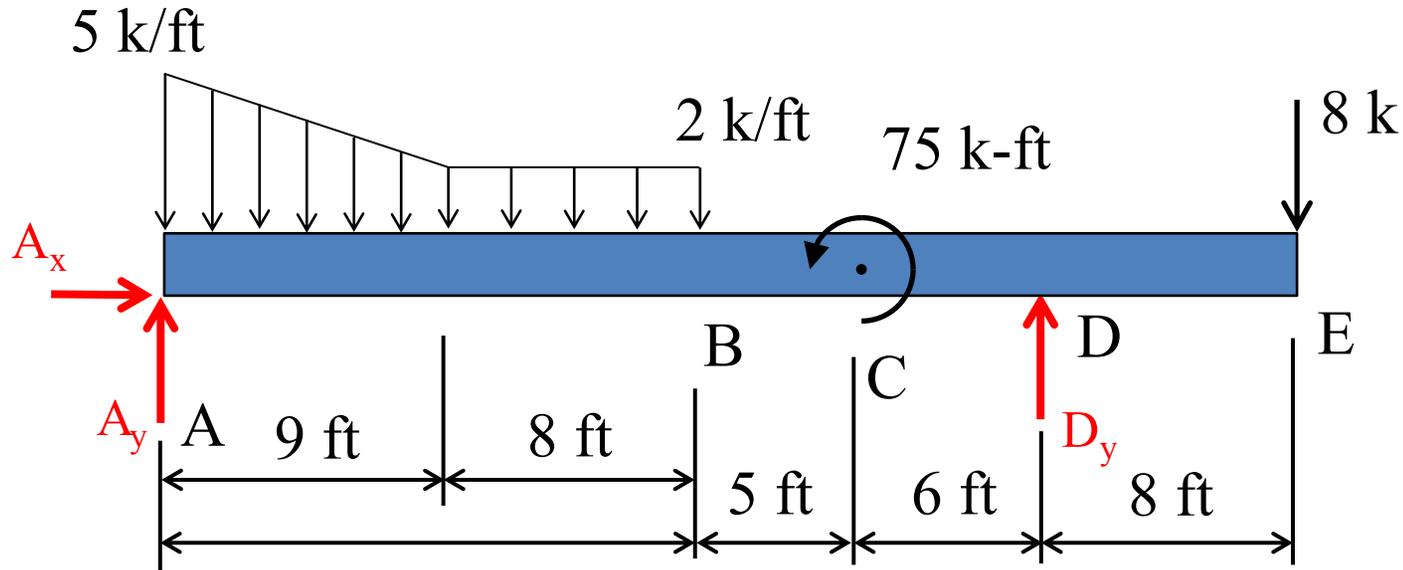
San Jose State University

Consider the Beam with the Supports and Loading



The overhanging beam has a pin support at A and a roller support at D. For the loads shown, find the support reactions.

Free Body Diagram of the Beam



$$\rightarrow \sum F_x = 0 \quad \rightarrow \quad A_x = 0$$

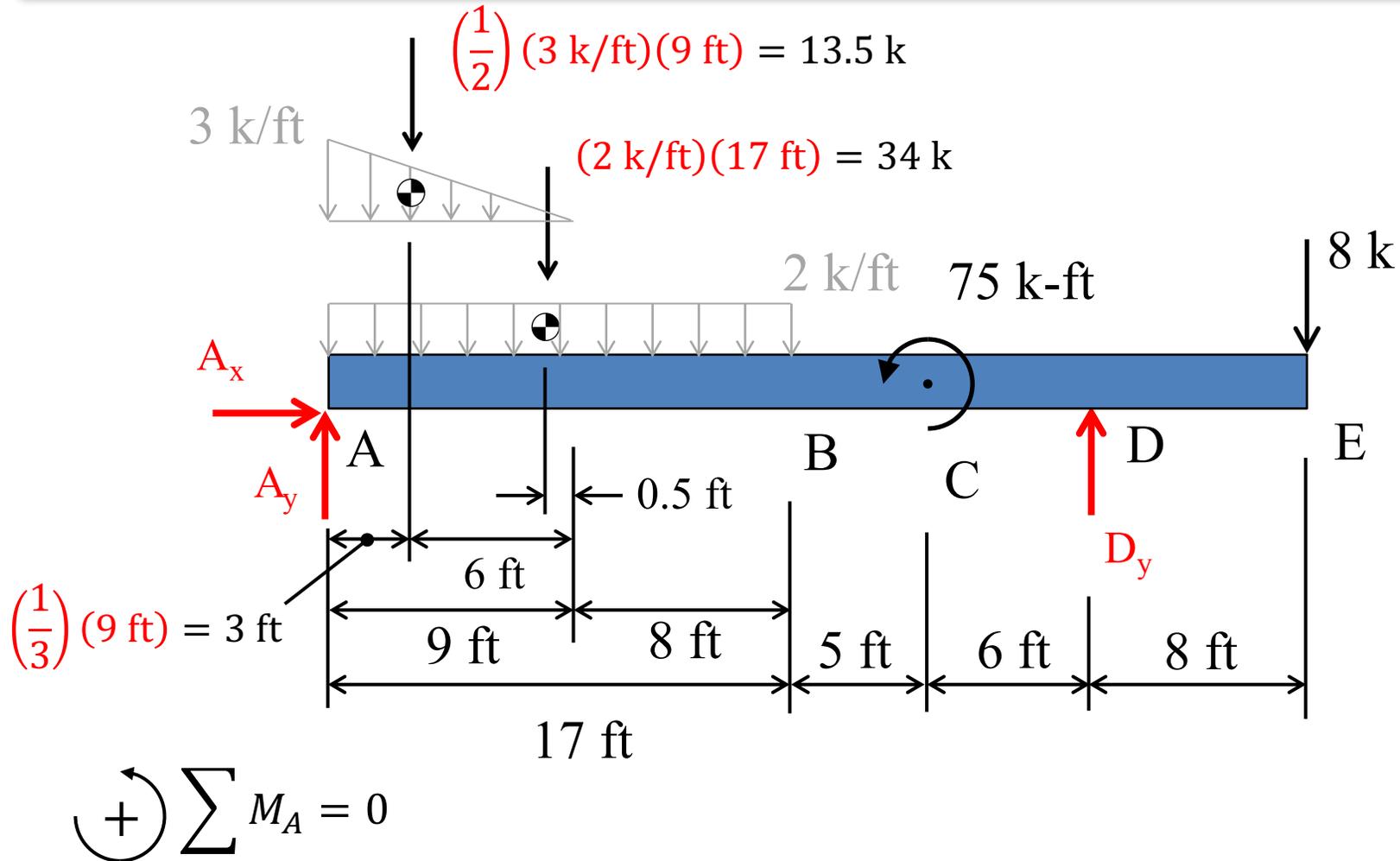
$$\curvearrowright \sum M_A = 0 \quad \rightarrow \quad ?$$

How can we account for the effect of the distributed load?

$$+\uparrow \sum F_y = 0 \quad \rightarrow \quad ?$$

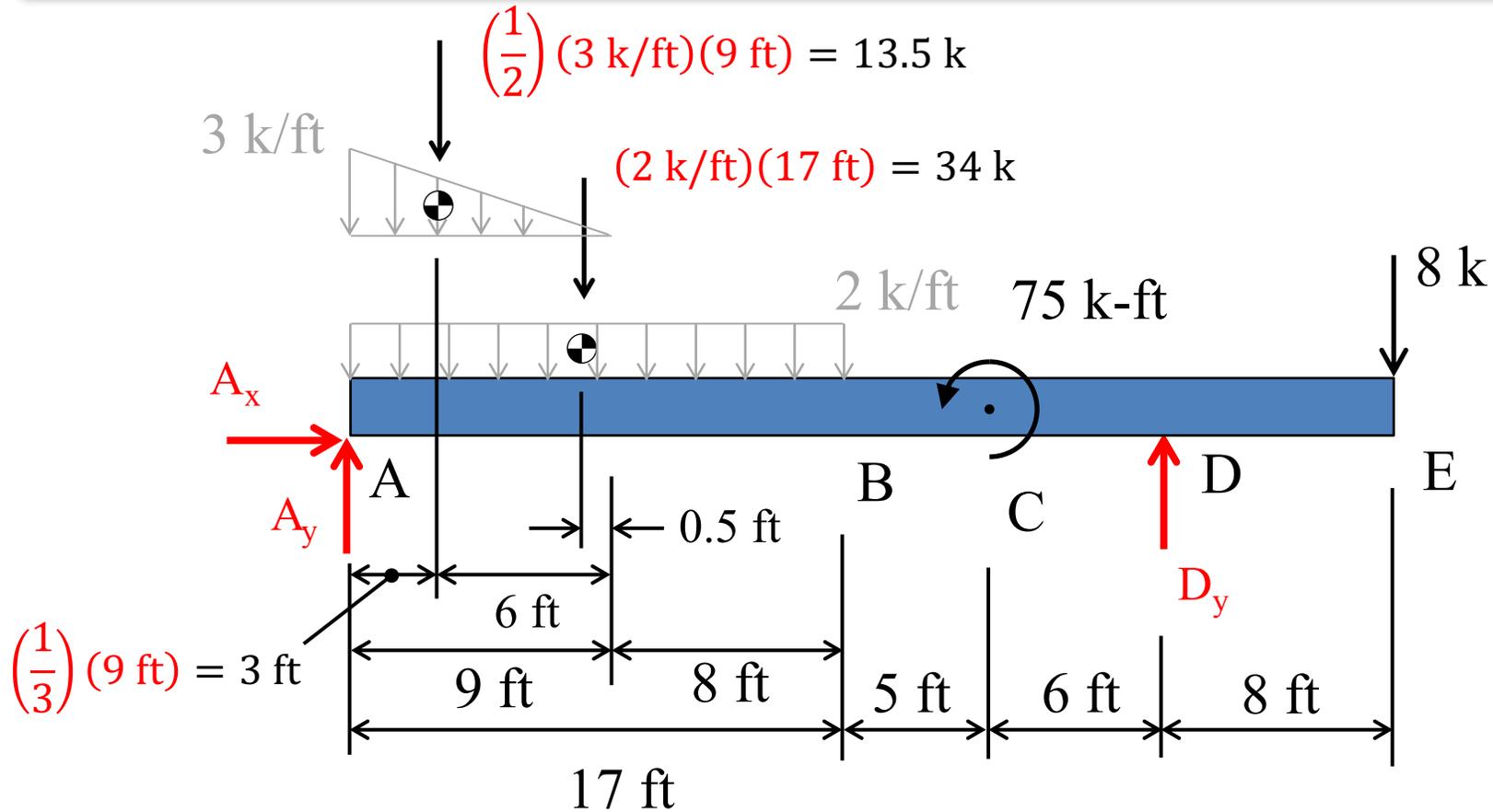
We need to find point loads that are equivalent to the distributed load

Free Body Diagram of the Beam with Equivalent Point Loads



$$D_y = 19.375 \text{ k}$$

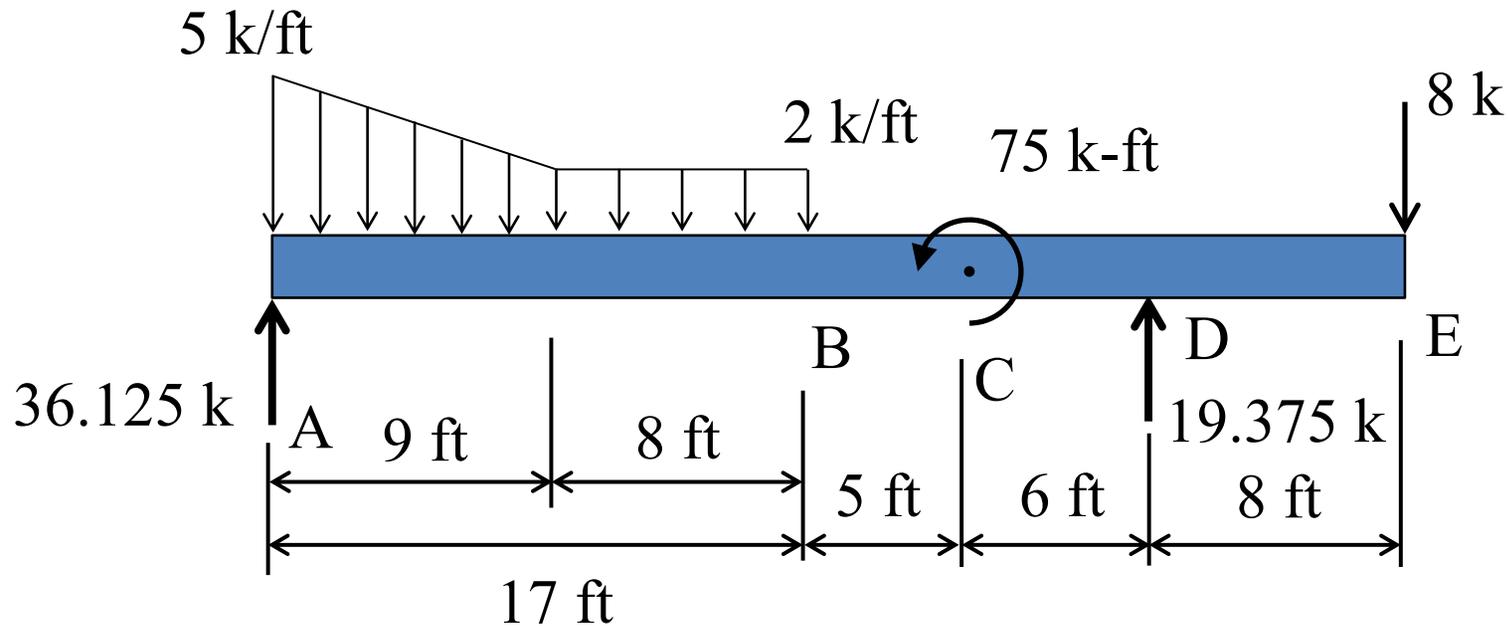
Free Body Diagram of the Beam with Equivalent Point Loads



$$+\uparrow \sum F_y = 0$$

$$A_y = 36.125 \text{ k}$$

Free Body Diagram of the Beam Showing Support Reactions



Note that **internal forces between points A and B** will depend on the type of loading