Consider the simply supported beam shown below. It carries a total load of $W$, lb. Two possible distributions of the load are shown, one with $W$ being distributed over the entire length of the beam, the second with $W$ represented by three concentrated loads, acting at mid-span and at the ends of the beam. The second corresponds to the loading that would result from the beam supporting joists at those points. Do the following:

a. Plot the moment and shear diagrams for the two cases shown.

b. Assume instead that the beam supports a larger number of joists, for example, 5 joists at $x = 0$, $x = L/4$, $x = L/2$, $x = 3L/4$, $x = L$. Try several configurations and decide how many joists would be needed so that the resulting moment and shear diagrams on the beam would be essentially the same as moment and shear for a distributed load.