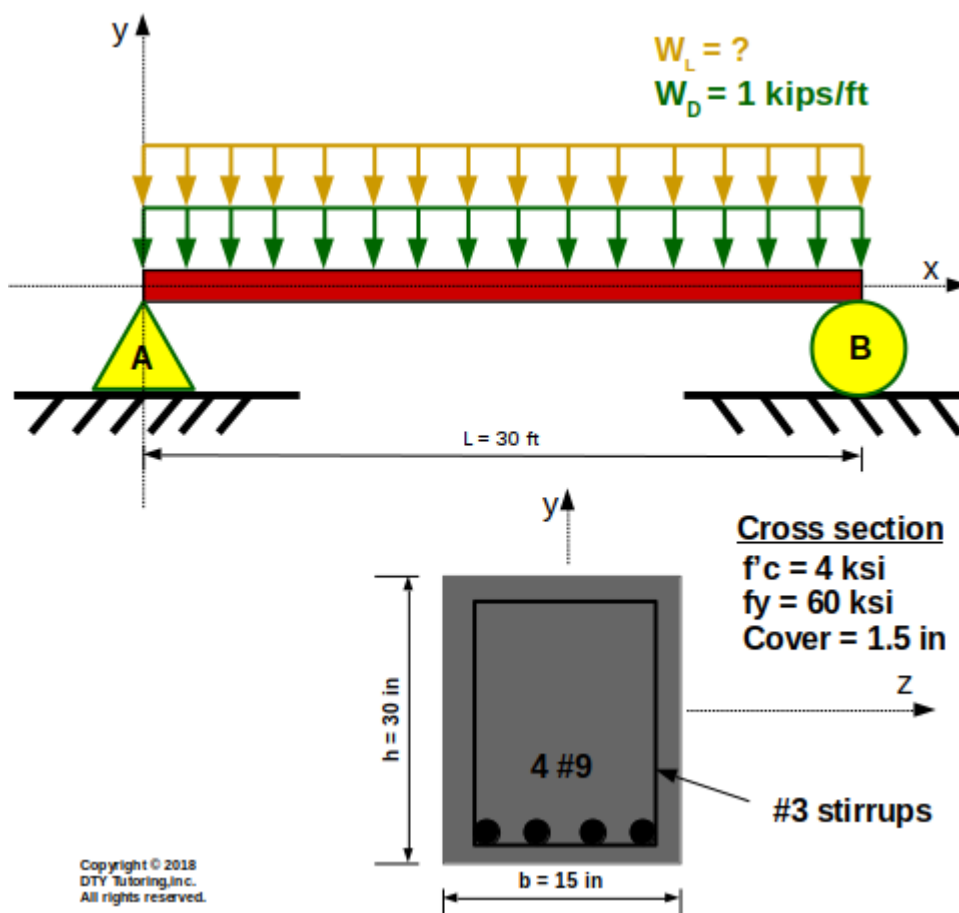Find the uniformly distributed live load, w_L, of the reinforced concrete cross section for the simply supported beam with a uniform live and dead load (self-weight is not included) as shown below, assuming that the steel has yielded (use factored loads). The unit weight of the reinforced concrete section, Υ_{conc} is 150 pcf.

$W_L = ?$
$W_D = 1$ kips/ft

$L = 30$ ft

Cross section
f'c = 4 ksi
fy = 60 ksi
Cover = 1.5 in

h = 30 in

4 #9

#3 stirrups

b = 15 in

Answers (refer to solutions for detail)

$$w_L = 1.42 \text{ kips/ft}$$