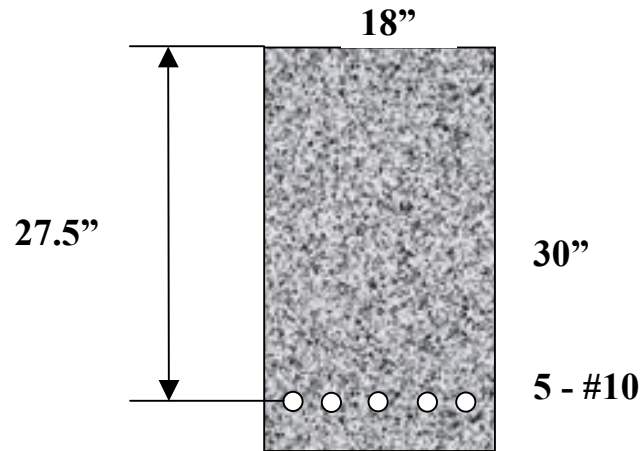# CE 142: PROBLEM SET #2

MOMENT CURVATURE AND ϕM_n CALCULATIONS

2.1 For the beam given below, draw a moment-curvature diagram. Make appropriate calculations for crack (just prior to cracking, and just after cracking), yield, and ultimate moment and curvature. For the crack point, neglect the influence of the reinforcement on the crack moment and curvature.

18"

27.5"

30"

5 - #10

2.2 For the following sections, compute ϕM_n. Also compute the depth of the neutral axis, the curvature, and the strain in the reinforcement (for a maximum compression strain of 0.003). Use 1.5" cover and assume #3 stirrups for all cases. For case (b), the beam has a 2"x8" opening.

(a) $f'_c = 4$ ksi   (b) $f'_c = 4$ and 6 ksi

14"

8"   3"

2"

24"

4 - #8   4 - #9