Exam 1-3

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Problem 3: A person is extracting a post from the ground using the structure shown.

If the person exerts a vertical downwards force of 144 lb to extract the post, find

(a) F_{AB} (b) F_{CD}

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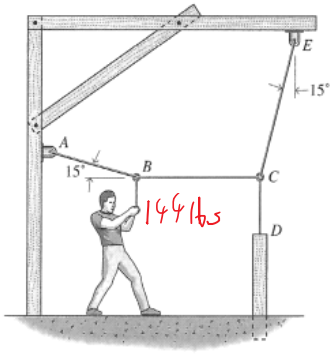

$F_x = 0$

$F_x = F_{BC} - F_{AB}\cos(15)$

$F_y = 0$

$F_y = F_{AB}\sin(15) - 144$

$F_{AB}\sin(15) = 144$

$F_{AB} = \frac{144}{\sin(15)}$

$F_{AB} = 556.37\text{lbs}$

$F_{BC} = F_{AB}\cos(15)$

$F_{BC} = 537.41\text{ lbs}$

A.)

$F_x = 0$

$F_x = F_{CE}\sin(15) - 537.41$

$F_{CE} = 2076.39\text{lbs}$

$F_y = 0$

$F_y = F_{CE}\cos(15) - F_{CD}$

$F_{CD} = F_{CE} \cos(15)$

B.) $F_{CD} = 2005.64 \text{ lbs}$