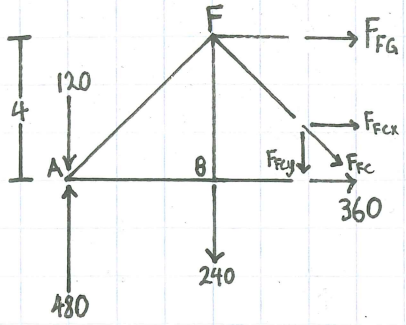
CIV102 - STRUCTURES and MATERIALS

Topic: Method of Joints

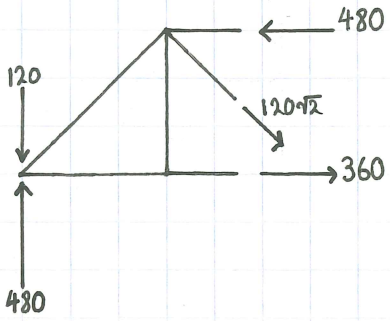
1) From Last Time



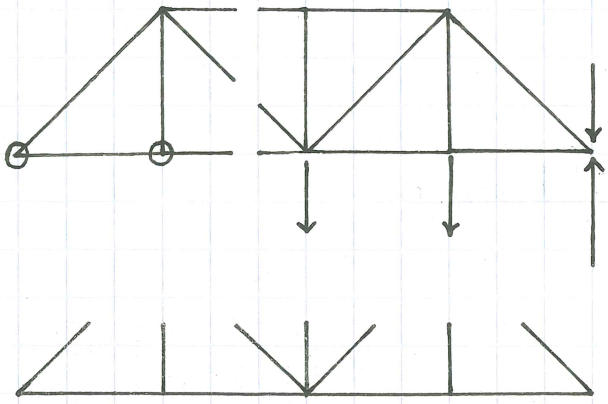
$\Sigma F_x = 0$
$\Sigma F_y = 0$
$\Sigma M = 0$

$\Sigma F_y = 0$
$0 = 480 - 120 - 240 - F_{FCy}$
$F_{FCy} = 120KN$ (tension)

$F_{FCx} = F_{FCy} = 120KN$ Since F_{FC} @ 45°



$\Sigma F_x = 0$
$0 = F_{FG} + 120 + 360$
$F_{FG} = -480KN$ (Compression)

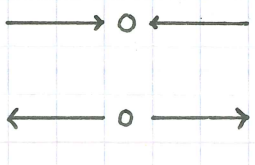


7 Unknowns

2) Method of Joints

Do an FBD @ each joint

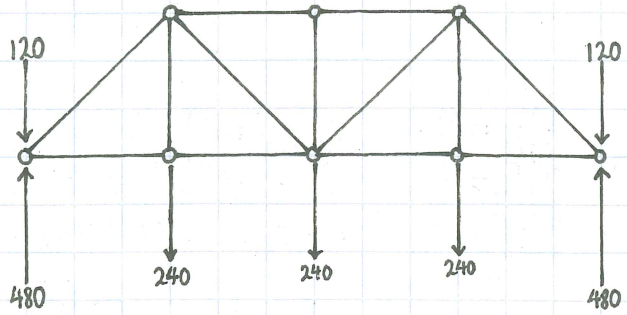
- The pin in the hinge is what the freebody diagram is of



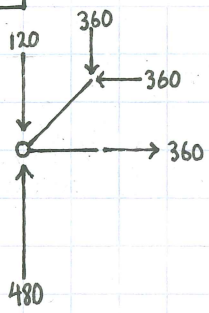
Since all forces go through the center of the pin $\Sigma M = 0$ tells us only $0 = 0$

Only 2 equations left $\Sigma F_x = 0$
$\Sigma F_y = 0$

Example: Same Truss

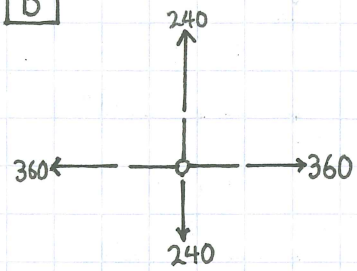


A

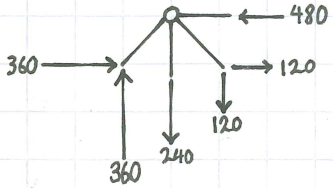


$F_{Diag} = 360\sqrt{2}$

B



F



Exam (Asymmetrically Loaded Truss)