

## ADMINISTRATION

- OFFICE HOURS
- NOTES ON SYLLABUS
- PREREQUISITES
- HOMEWORK ASSIGNMENT (DUE IN 1 WEEK)
- ~~COURSE LEARNING OBJECTIVES (SEE HANDOUT)~~
- QUIZ #1

## THREE AREAS OF LEARNING

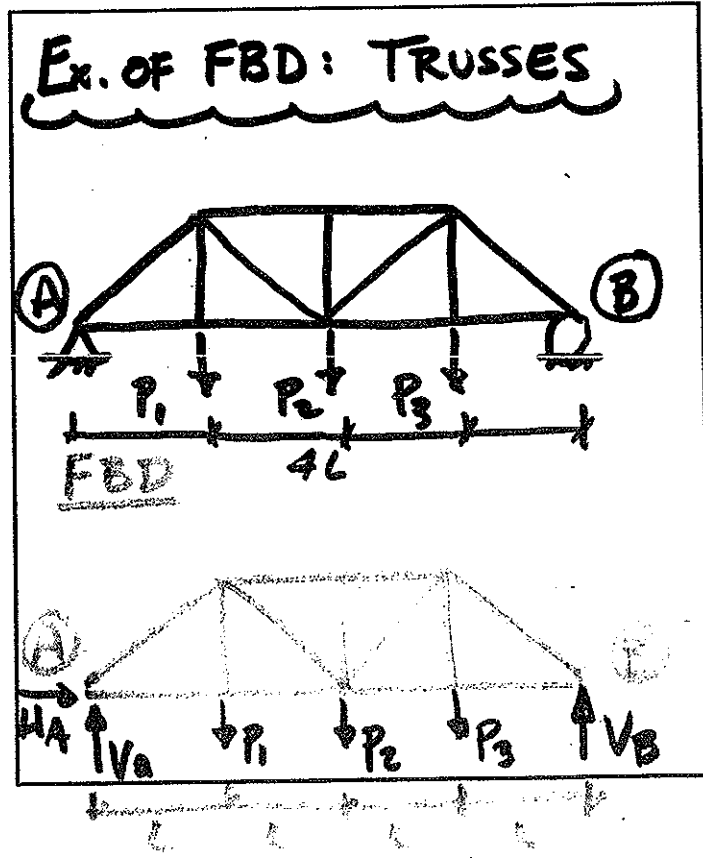
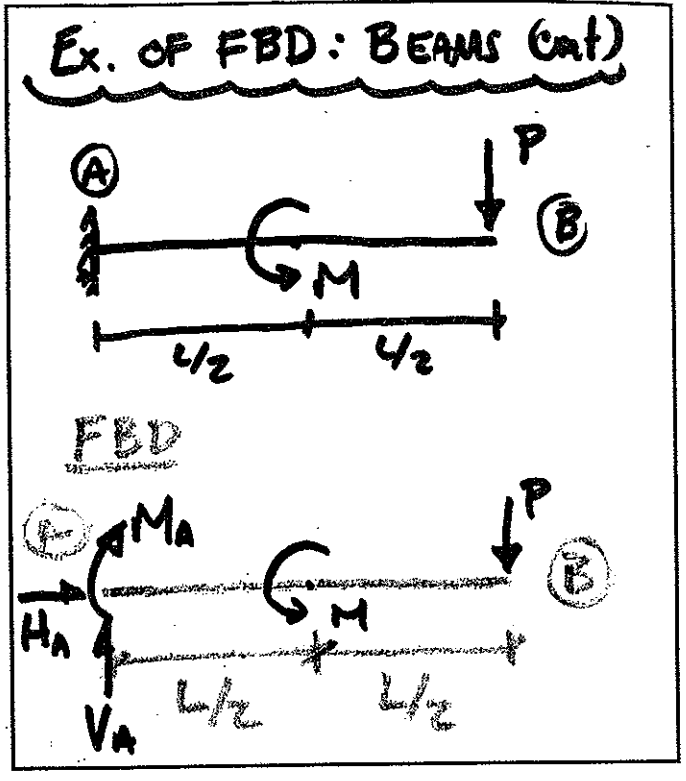
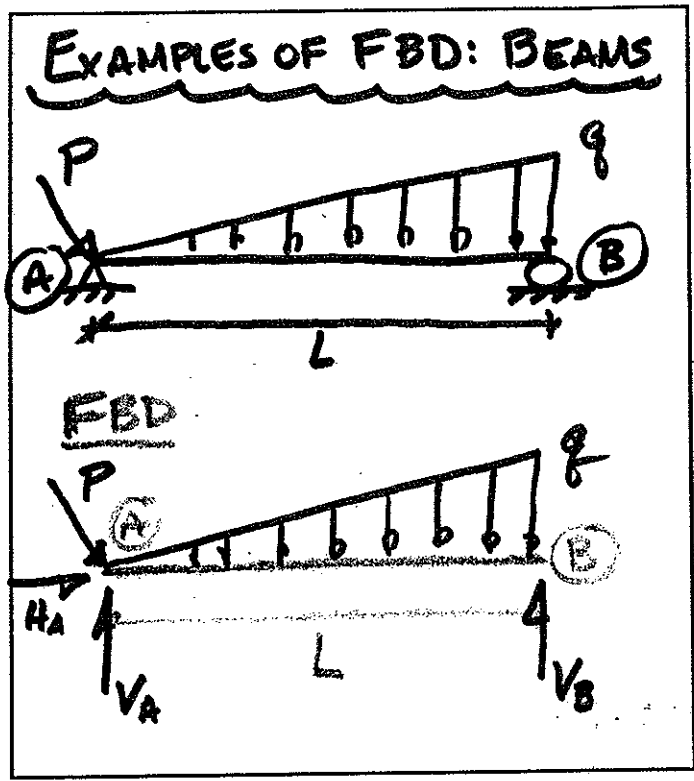
1. BEFORE CLASS READING ASSIGNMENT
2. IN CLASS PARTICIPATION
3. AFTER CLASS HOMEWORK ASSIGNMENT & STUDY

## OBJECTIVES

- DEFINE FBD
- DRAW ACCURATE FBD FOR BEAM & TRUSS
- DEFINE CONDITIONS FOR 2-D EQUILIBRIUM
- APPLY EQUATIONS OF 2-D E<sub>q</sub> to FBDs

## FREE BODY DIAGRAM (FBD)

DEFINITION: A DIAGRAM OF THE ~~BODY~~ <sup>A STRUCTURE</sup> ISOLATED OR FREED FROM ITS SUPPORTS, AND SHOWING ALL THE EXTERNAL (APPLIED AS WELL AS REACTION) FORCES ACTING ON IT. DIMENSIONS ARE SHOWN ALSO



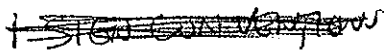
USE NUMBERS  
HERE TO HELP  
WITH NEXT TOPIC

THREE CONDITIONS FOR 2-D E<sub>q</sub>M

1.  $\sum F_x = 0$

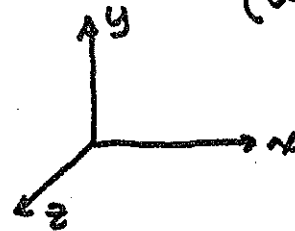
2.  $\sum F_y = 0$

3.  $\sum M_z = 0$



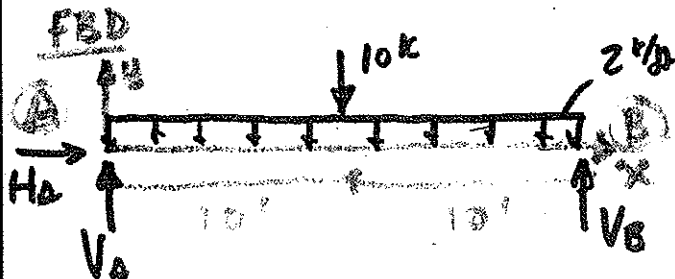
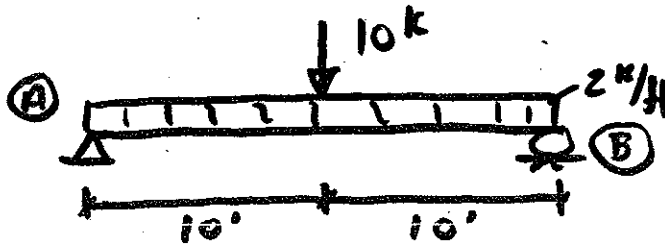
Note:

THIS REQUIRES ESTABLISHING A COORDINATE SYSTEM TO WORK IN (USUALLY CARTESIAN)



AND SELECTING POSITIVE DIRECTION FOR EACH EQUATION (ARBITRARY)

APPLY 2-D E<sub>q</sub>M to FBDs



2-D E<sub>q</sub>M (cont)

$\sum F_x = 0 = H_A + 0$

Note  $\therefore H_A = 0$

$\sum M_z = 0 = 10k(10') + (2 \frac{k}{ft})(20')(10')$   
 $= 20' V_B$

$V_B = 25k \uparrow$

$\sum F_y = 0 = -10 - (2)(20) + 25 + V_A$

SIGN CONVENTION  $V_A = 25k \uparrow$

CHECK !!!

SIG FIGS, ROUND OFF