



# Recitation 004

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09/06/2024

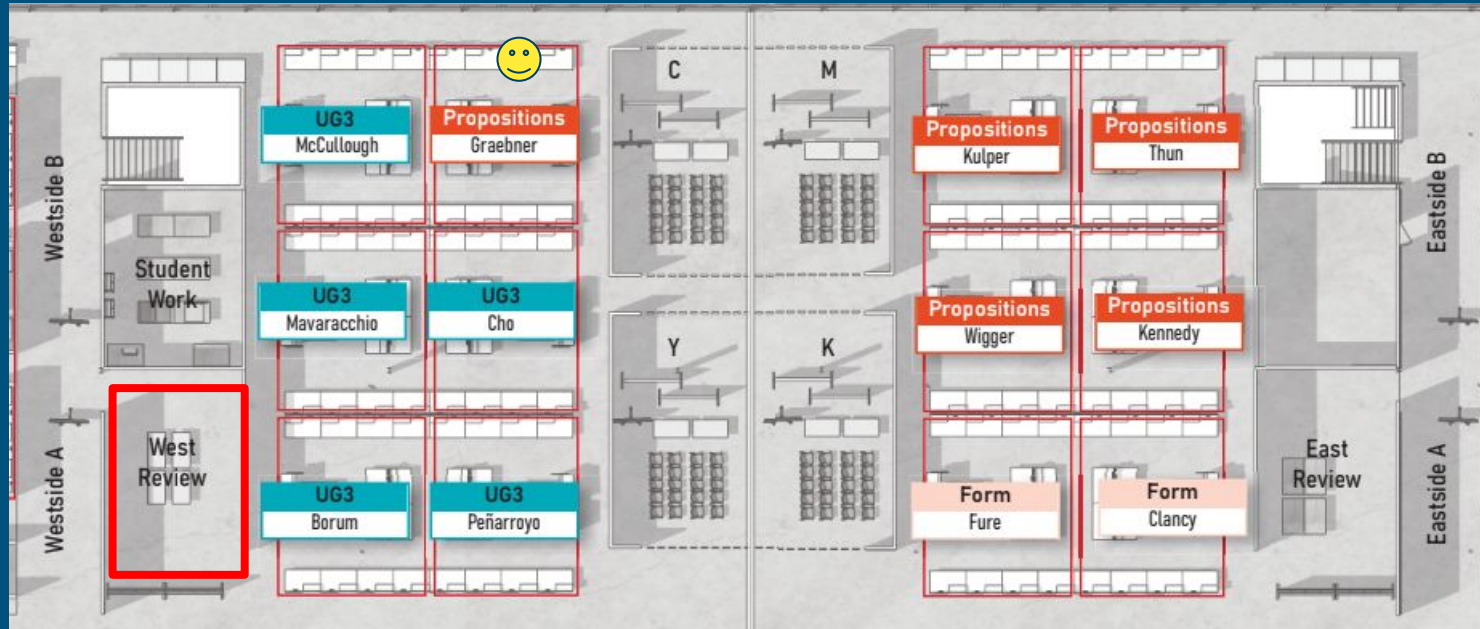


# GSI Info

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Give me 24 hours to respond\*



# Introductions

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Who you are and

Either 1 question about the class

Or

Best Bridge name you can think of

# Questions

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# Points

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1. Homework
2. In-person Lecture quizzes or recorded lectures with quizzes
3. Bridge Lab Report/Bridge
4. Topic Quizzes
5. Recitation Labs

# Homework

Problems  
Check Points

Problem FAQ



#

Description

Due Date

Current Scores

- 1 -

Dead Load Calculation










9-06-2024

(1) 20/20 completed  
(2) 20/20 completed  
(3) 0/20 not completed

# In-person/Lecture Quizzes

Won't get you points

Lectures	Date	w/Quiz	Video	Slides	Notes
Course Intro	Aug 26				
Vertical Loads on Structures	Aug 28				
Lateral Loads on Structures	Aug 30				
Statics and Vector Addition	Sep 4				
Moment of a Force	Sep 9				

## 2. Three Vector Addition

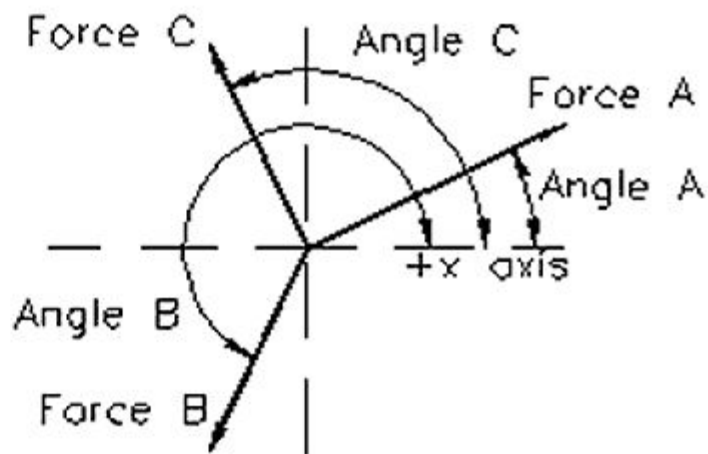
Find the horizontal and vertical components of each of the three forces shown. Then find the resultant of all forces and the angle measured counter-clockwise from the + x-axis.

DATASET: 1

-2-

-3-

Force A	35 LBS
Angle A	61 DEGREES
Force B	11 LBS
Angle B	169 DEGREES
Force C	53 LBS
Angle C	353 DEGREES

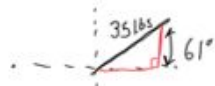


#	Question		
1	Horizontal component of Force A (+ to right: - to left)	6	Vertical component of Force C (+ upward: - downward)
2	Vertical component of Force A (+ upward: - downward)	7	Sum of horizontal components (+ to right: - to left)
3	Horizontal component of Force B (+ to right: - to left)	8	Sum of vertical components (+ upward: - downward)
4	Vertical component of Force B (+ upward: - downward)	9	Resultant of Forces A + B + C (absolute value)
5	Horizontal component of Force C (+ to right: - to left)	10	Angle of the Resultant in DEGREES from + x axis counterclockwise

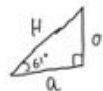
Due 9/8/24

Force A

Given



1.) Horizontal Component Force A



Soh Cah Toa

H = 35 LBS

a = horizontal component

Angle =  $61^\circ$

So we need Cos

$$\cos(61^\circ) = \frac{a}{35 \text{ lbs}}$$

$$0.4848 = \frac{a}{35} = 16.9683 \text{ lbs}$$

to the Right  
so it is  
positive

2.) Vertical Component Force A



Soh Cah Toa

o = vertical component

H = 35 LBS

Angle =  $61^\circ$

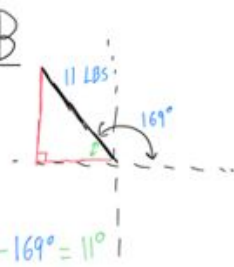
$$\sin(61^\circ) = \frac{o}{35 \text{ lbs}}$$

$$0.8746 = \frac{o}{35} = 30.6117 \text{ lbs}$$

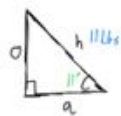
it is upwards  
so it is positive

## Force B

Given



3.) Horizontal Component Force B



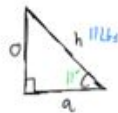
Soh Cah Toa  
a = horizontal component

$$\cos(11^\circ) = \frac{a}{11 \text{ Lbs}}$$

$$0.9816 = \frac{a}{11} = -10.7979$$

it is to the Left ↗  
so it is negative

4.) Vertical Component Force B



Soh Cah Toa  
o = vertical component

$$\sin(11^\circ) = \frac{o}{11 \text{ Lbs}}$$

$$0.1908 = \frac{o}{11} = 2.0989$$

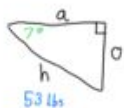
it is upwards ↗  
so it is Positive

## Force C

Given



5.) Horizontal Component Force C



Soh Cah Toa

$a = \text{horizontal component}$

$$\cos(7^\circ) = \frac{a}{53 \text{ lbs}}$$

$$0.9925 = \frac{a}{53} = 52.6049 \text{ LBS}$$

it is upwards  
so it is Positive

6.) Vertical component of Force C



Soh Cah Toa

$o = \text{vertical component}$

$$\sin(7^\circ) = \frac{o}{53}$$

$$0.1219 = \frac{o}{53} = -6.4591 \text{ LBS}$$

it is downwards  
so it is negative

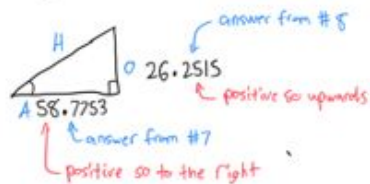
7.) Sum of Horizontal Components

$$\begin{array}{r} 16.9683 \quad \leftarrow \text{answer from \#1} \\ -10.7979 \quad \leftarrow \text{answer from \#3} \\ + 52.6049 \quad \leftarrow \text{answer from \#5} \\ \hline 58.7753 \end{array}$$

8.) Sum of Vertical Components

$$\begin{array}{r} 30.6117 \quad \leftarrow \text{answer from \#2} \\ 2.0989 \quad \leftarrow \text{answer from \#4} \\ -6.4591 \quad \leftarrow \text{answer from \#6} \\ \hline 26.2515 \end{array}$$

9.) Resultant force



$$A^2 + B^2 = C^2$$

$$26.2515^2 + 58.7753^2 =$$

$$689.1413 + 3,454.5359 = 4,143.6772$$

$$\sqrt{4,143.6772} = 64.3714 \text{ LBS}$$

10. Angle of Resultant

Soh Cah Toa

$$\tan^{-1}(x) = \frac{o}{a} = \frac{26.2515}{58.7753}$$

$$x = 24.0675^\circ$$