

Problem Set 1

for the ENS161 B5-1 and B6 classes offered in A.Y. 2025-2026 S1

Instructions. Write your full solutions and answers in white A4 sheets of paper, in portrait orientation. Staple your submission, making sure to include the duly accomplished summary of answers.

Problem No.	Parameters	Values	
		B5-1	B6
1	θ_1, θ_2	20°, 40°	40°, 20°
	F_1, F_2	5 kN, 5 kN	3 kN, 7 kN
2	$\theta_1, \theta_2, \theta_3$	29°, 46°, 29°	29°, 46°, 29°
	F_1, F_2, F_3	0.5 kN, 0.26 kN, 0.35 kN	0.5 kip, 0.26 kip, 0.35 kip
3	α, F_A, θ	25°, 0.3 kip, 41°	35°, 0.5 kN, 39°
4	α, F	17°, 17 kN	21°, 21 kN
5	θ_1, θ_2	90°, 58°	90°, 62°
	F_1, F_2, F_{\max}	2.6 kN, 0.7 kN, 2.1 kN	2.6 kip, 0.7 kip, 2.1 kip
6	α, F_2, F_3, F	60°, 0.15 kN, 0.175 kN, 0.75 kN	60°, 0.25 kN, 0.185 kN, 0.85 kN

Unless otherwise specified, angles and vector directions are in degrees. Express final answers in five (5) decimal places and enclose them in boxes. Be sure to include appropriate units in your answers. Maintain cleanliness and comeliness in your submission (especially when erasure is unavoidable).

You obviously are not prohibited from dishonestly accomplishing this problem set, but you are expected to study the topics covered herein.

Summary of Answers to Problem Set 1
for the ENS161 B5-1 and B6 classes offered in A.Y. 2025-2026 S1

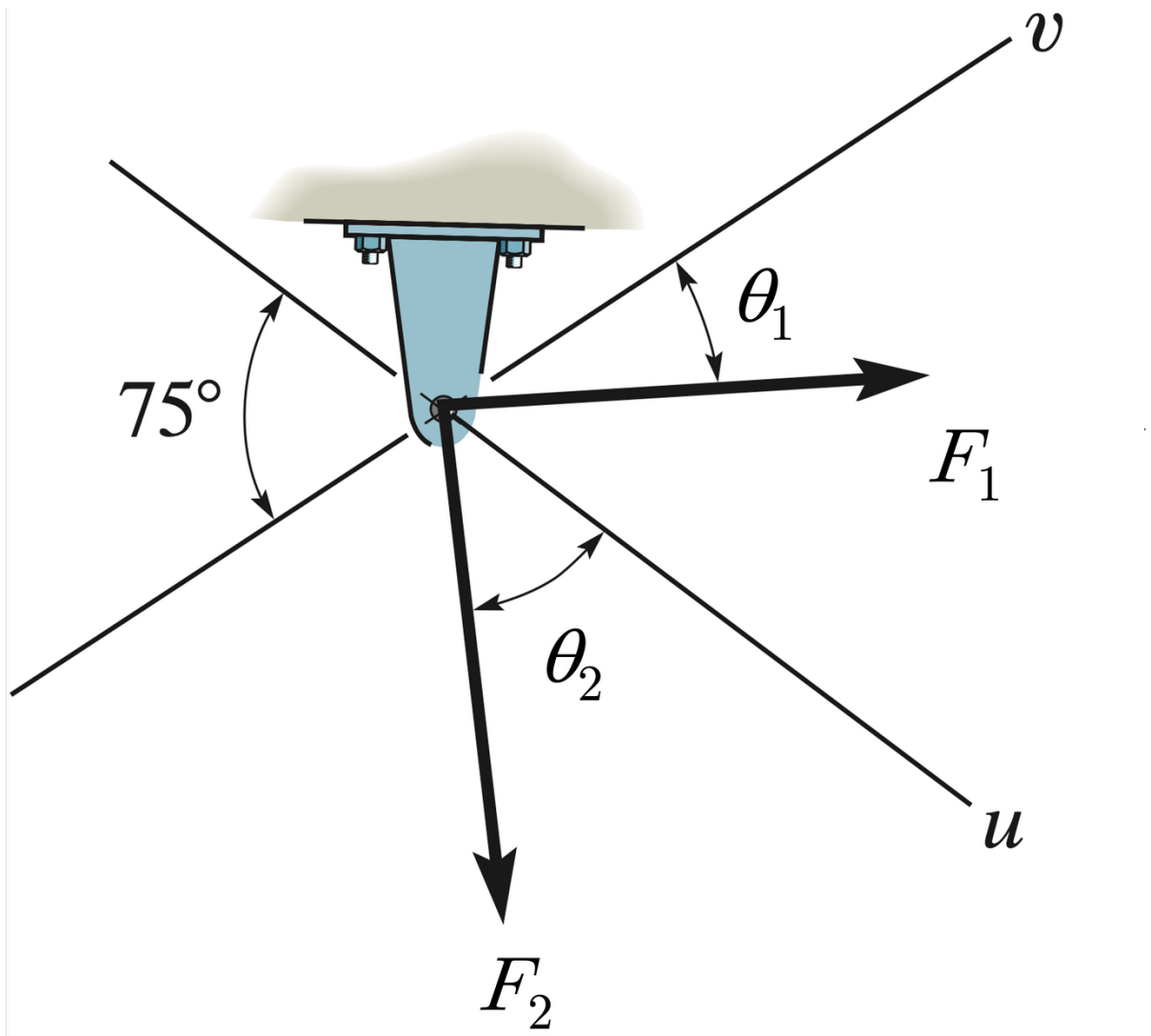
Name: _____

ID no.: _____

Section: _____

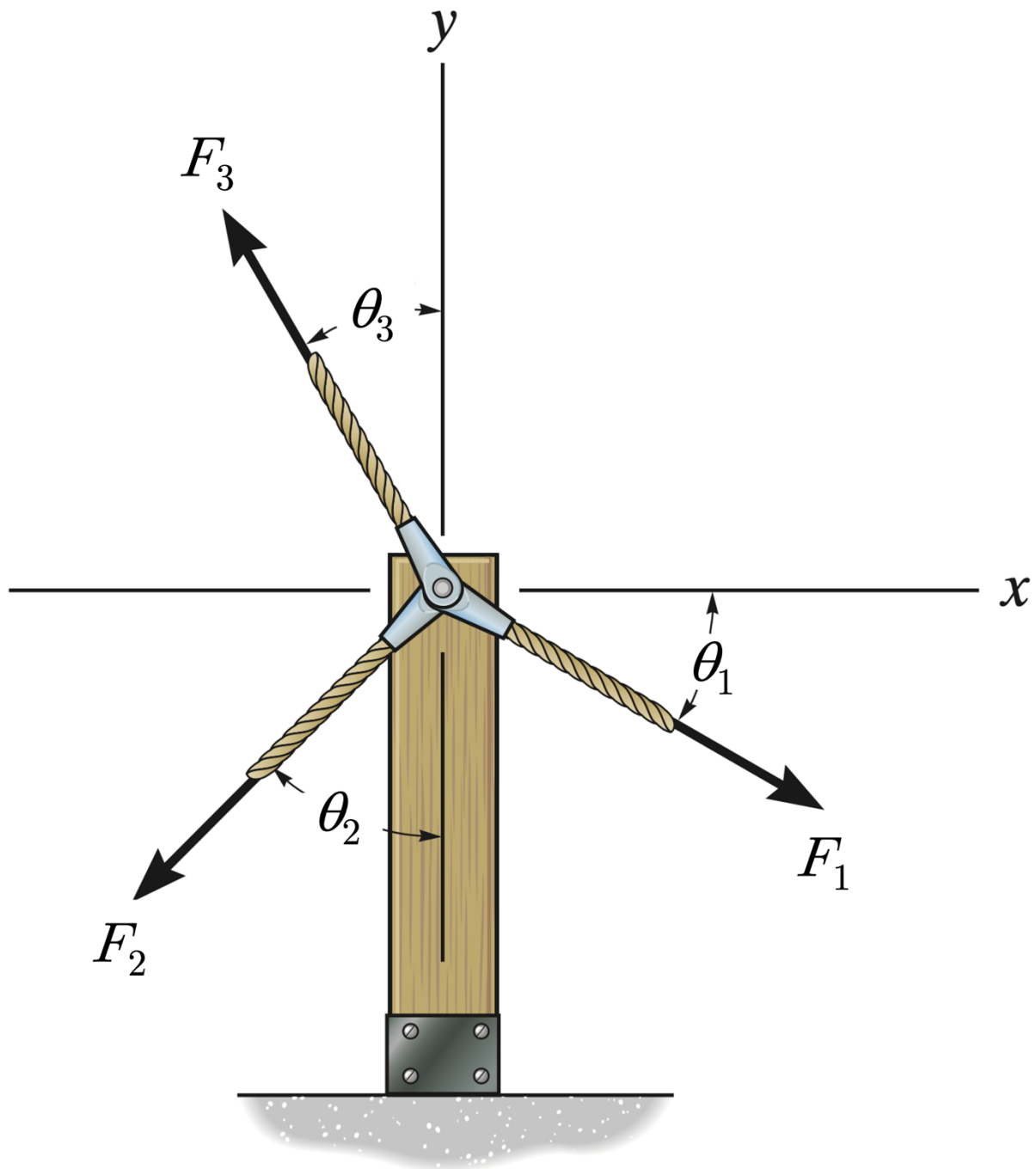
	a.	b.
Problem 1	c.	d.
	e.	f.
Problem 2	a.	b.
Problem 3	a.	b.
Problem 4	a.	b.
	c.	
Problem 5	a.	b.
Problem 6	a.	b.

Score: _____



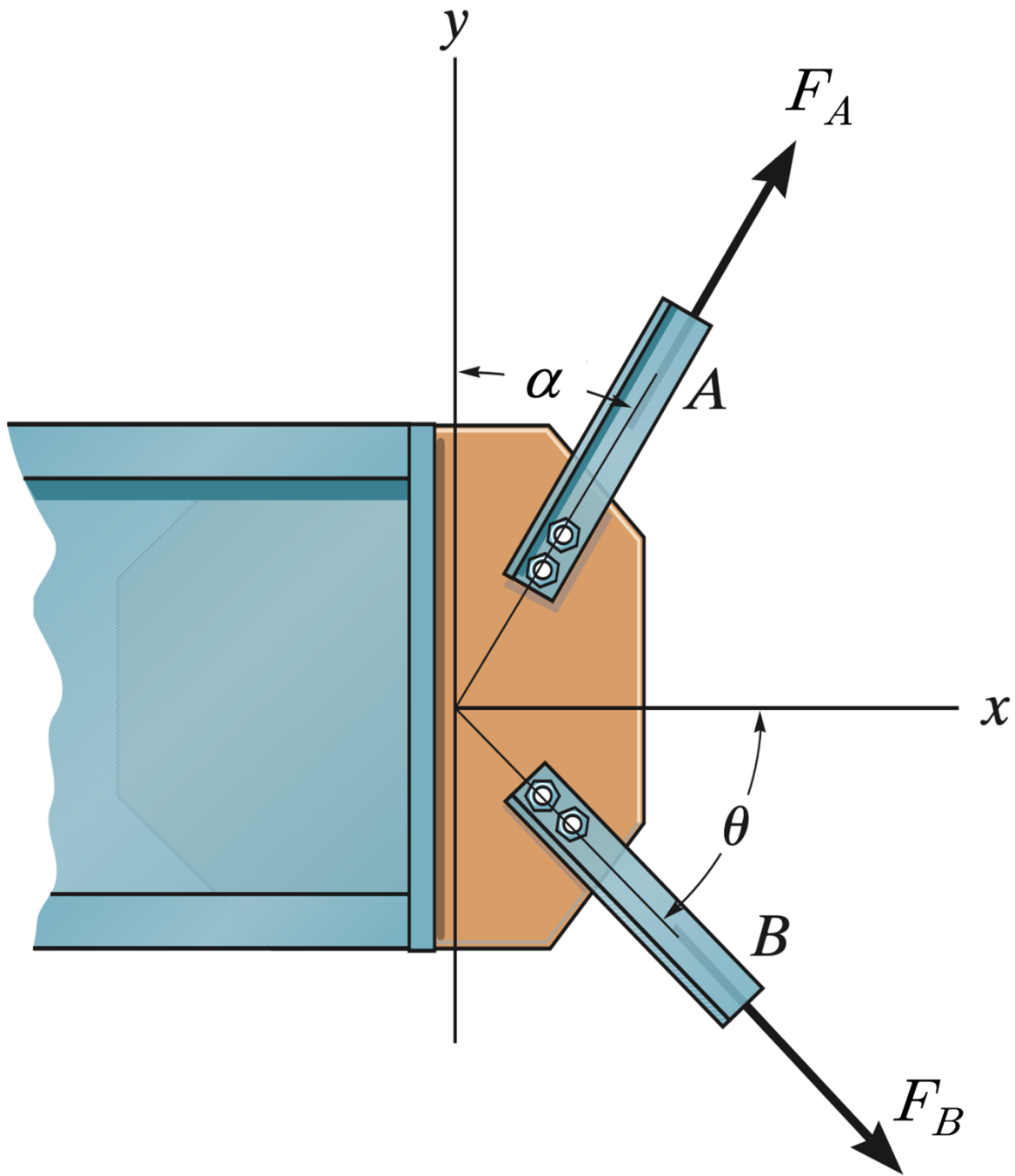
Problem 1. Determine:

- the magnitude of the resultant \mathbf{F} of the two forces;
- the direction of \mathbf{F} , measured clockwise from the positive v -axis;
- the magnitude of the component of \mathbf{F}_1 acting along the u -axis;
- the magnitude of the component of \mathbf{F}_1 acting along the v -axis;
- the magnitude of the component of \mathbf{F}_2 acting along the u -axis; and
- the magnitude of the component of \mathbf{F}_2 acting along the v -axis.



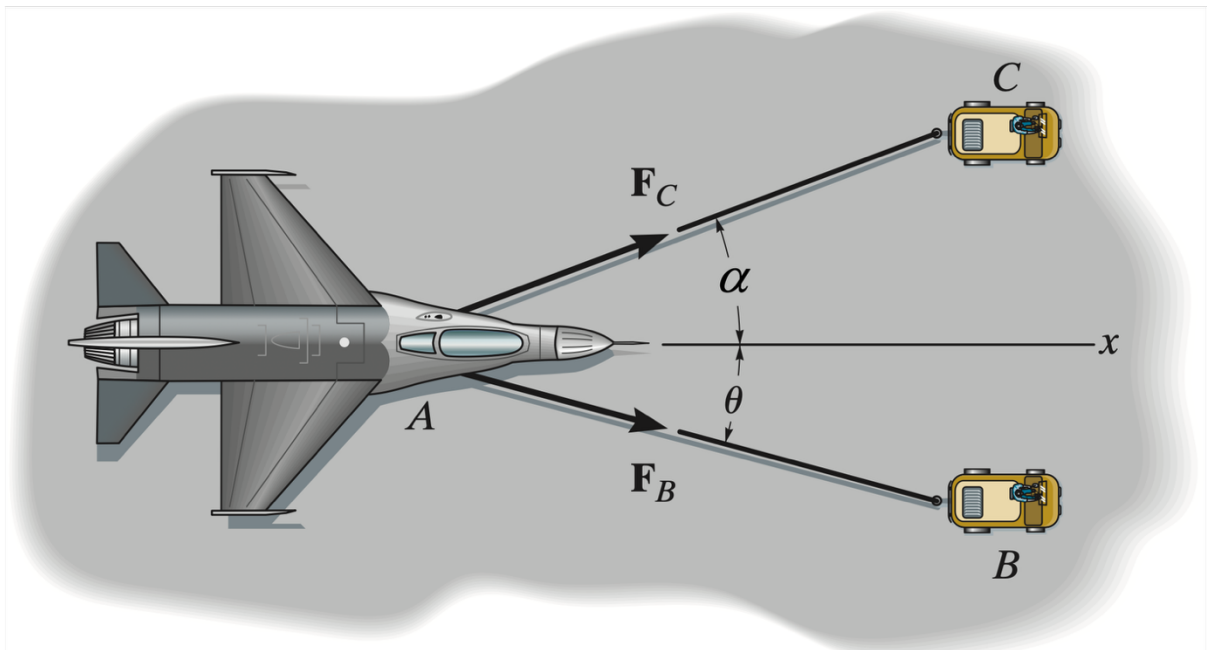
Problem 2. Determine:

- the magnitude of the resultant, and
- its direction measured counterclockwise from the negative y -axis.



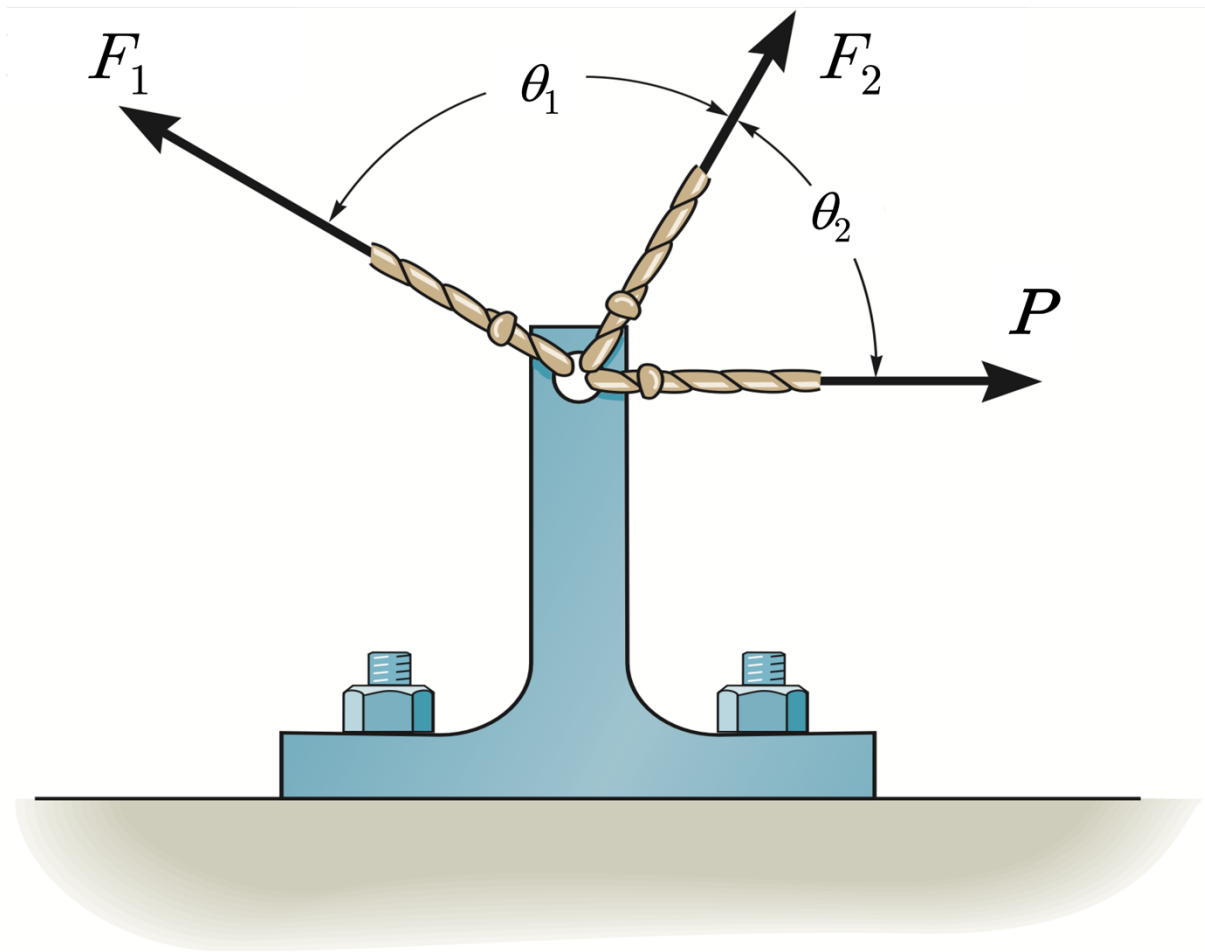
Problem 3. Solve for:

- the magnitude of F_B so that the two forces have a resultant along the positive x -axis; and
- the magnitude of the said resultant.



Problem 4. If $\mathbf{F}_B + \mathbf{F}_C$ has a magnitude of F and is directed along the positive x -axis, determine:

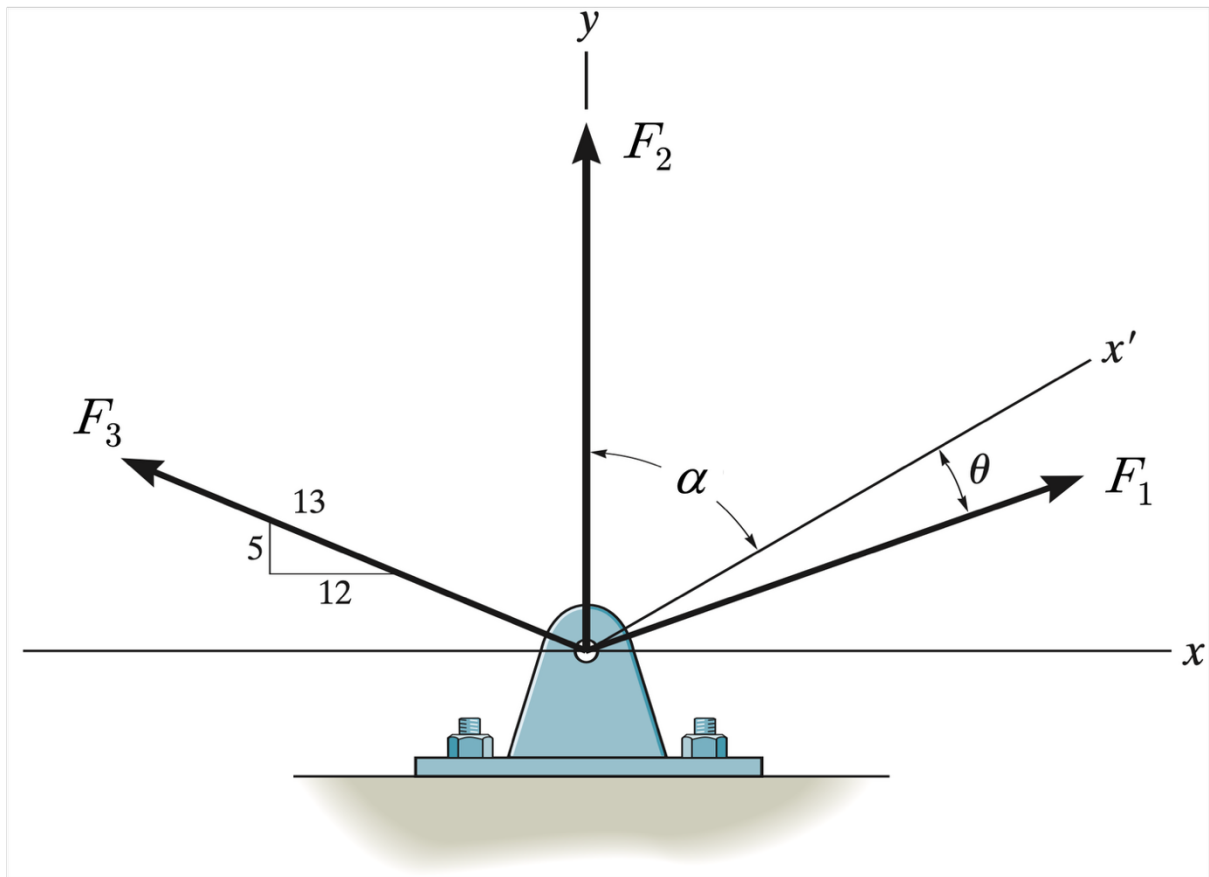
- the value of θ for which the pulling force by the truck at B is a minimum;
- the corresponding magnitude of \mathbf{F}_B ; and
- the corresponding magnitude of \mathbf{F}_C .



Problem 5. Determine:

- the minimum magnitude and
- the maximum magnitude

of the force P so that the bracket experiences a force of no more than F_{\max} .



Problem 6. If the bracket is designed to experience a net force of F along the positive x' -axis, solve for:

- F_1 , and
- θ .