

MATH 2083 - Turn-In Homework #2

Directions: In each of the following problems, three forces are acting on an object which is located at the origin. Please include a sketch of each system of forces.

1. $\overline{F}_1 = \langle 1, 2 \rangle$, $\overline{F}_2 = \langle -2, 3 \rangle$, and $\overline{F}_3 = \langle -1, -4 \rangle$. Find the magnitude and direction of each of these forces. Is the system in equilibrium? If not, find the magnitude and direction of the resultant force.
2. \overline{F}_1 has a magnitude of 12 pounds, \overline{F}_2 has a magnitude of 20 pounds, and the magnitude of \overline{F}_3 is unknown. The forces have directions 60° , 120° and 210° , respectively. Is it possible for this system to be in equilibrium? That is, can you find a value for the magnitude of \overline{F}_3 which puts the system in equilibrium? If so, find the magnitude and the components of \overline{F}_3 .
3. \overline{F}_1 , \overline{F}_2 and \overline{F}_3 have magnitudes of 20, 15, and 30 pounds, respectively. The direction of \overline{F}_1 is 150° and the direction of \overline{F}_2 is 60° . Is it possible (ie. is there a direction for \overline{F}_3) for this system to ever be in equilibrium? If so, find the magnitude of the third force and the components of each of these forces.
4. $\overline{F}_1 = \langle 4, 2 \rangle$, $\overline{F}_2 = \langle -2, \sqrt{3} \rangle$, and $\overline{F}_3 = \langle -1, -\sqrt{2} \rangle$. Find the magnitude and direction of each of these forces. Is the system in equilibrium? If not, find the magnitude and direction of the resultant force.
5. \overline{F}_1 , \overline{F}_2 have magnitudes of 12 and 10 pounds, respectively. The direction of \overline{F}_1 is 150° and the direction of \overline{F}_2 is -60° . Find a force, \overline{F}_3 , which will put this system in equilibrium. Give \overline{F}_3 in terms of magnitude and direction as well as in terms of components.

This assignment is due Friday, August 23rd. You may discuss ideas/methods with your group members. You may use your notes and text. You may always ask me for guidance, but in the end, the work must be yours, which would mean you could clearly explain/present it to someone if asked.