Answer on Question #70569-Physics-Other

Three people pull simultaneously on a stubborn donkey. Jack pulls directly ahead of the donkey with a force of 97.3 N, Jill pulls with 94.1 N in a direction 45° to the left, and Jane pulls in a direction 45° to the right with 127 N. (Since the donkey is involved with such uncoordinated people, who can blame it for being stubborn?) Find the magnitude of the net force the people exert on the donkey.

Solution

The parallel projection of the resulting force is

$$F_x = 97.3 + 94.1\cos 45 + 127\cos 45 = 253.641\ N.$$

The parallel projection of the resulting force is

$$F_y = -94.1\sin 45 + 127\sin 45 = 23.264\ N.$$

The magnitude of the net force the people exert on the donkey is

$$F = \sqrt{F_x^2 + F_y^2} = \sqrt{(253.641)^2 + (23.264)^2} = 255\ N.$$

Answer: $255\ N$.