Module 06 - Lesson 1

Dynamics in Cartesian Coordinates

Question 1: In a modified game of curling the 25-kg stones are pushed via remote-controlled toy rockets. One such stone is initially pushed forward with a 10-N thrust, and 1 s later a 40-N thrust to the left is added. Find the magnitude of the acceleration of the stone after 3 s, considering there is no friction between the stone and the ice.

Question 2: A bicycle is propelled by a force of 20 N. A 12 N wind drag is also acting on the bicycle. If the mass of the bicycle and rider is $m = 100$ kg, and the magnitude of the resulting acceleration is 2.5 m/s^2, what is the angle between the two applied forces?

Problem: A 10-kg model rocket is launched upward with a thrust force of 80 N. A 30-N drag force is acting on the rocket at an angle of 60° from the vertical. (a) What is the shape of the rocket's trajectory? (b) By how much was the rocket deflected from the vertical after 4 s?