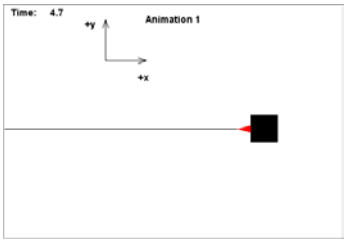
Worksheet for Exploration 4.5: Space Probe with Multiple Engines



A space probe is designed with four engines that can fire in the +x, -x, +y, and -y directions, respectively **(position is given in meters and time is given in seconds)**. For each of the situations below, first predict the motion of the space probe. Your prediction should be a detailed description of the motion of the probe. Only after you make a prediction check it by viewing the animation. An example is shown in the first row of the table. Restart.

Situation	Your prediction	Animation
The space probe has a constant velocity in the +x direction when suddenly an engine exerts a force on the probe in the +x direction.	The probe will have an acceleration in the +x direction Therefore, since it is already traveling in that direction when the engine fires, it will speed up and will continue moving in the +x direction.	Animation 1
The space probe has a constant velocity in the +x direction when suddenly an engine exerts a force on the probe in the -x direction.		Animation 2
The space probe has a constant velocity in the +x direction when suddenly an engine exerts a force on the probe in the +y direction.		Animation 3
The space probe has a constant velocity in the +x direction when suddenly an engine exerts a force on the probe in the -y direction.		Animation 4
The space probe has a constant velocity in the +x direction when suddenly an engine exerts a force on the probe in the -y direction and another engine exerts a force in the -x direction.		Animation 5
The space probe has a constant velocity in the +x direction when suddenly an engine exerts a force on the probe in the +y direction and another engine exerts a force in the +x direction.		Animation 6
The space probe has a constant velocity in the +x direction when suddenly all four engines fire simultaneously.		Animation 7