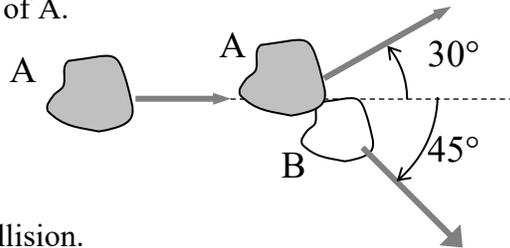


## Worksheet: Collisions

1. Find the final velocities of the particles in the following 1-D elastic collisions.

$m_1$	$v_{1i}$	$m_2$	$v_{2i}$	$v_{1f}$	$v_{2f}$
$m$	$v$	$m$	$-v$		
$m$	$v$	$\infty$	$0$		
$\infty$	$v$	$m$	$0$		
$m$	$v$	$m$	$0$		
$m$	$v_1$	$m$	$v_2$		
$2m$	$v$	$m$	$0$		
$m$	$v$	$2m$	$0$		
$m$	$v$	$10m$	$-v$		

2. Two asteroids of equal mass collide with a glancing blow. Asteroid A, which was initially traveling at 40.0 m/s, is deflected  $30.0^\circ$  from its original direction, while asteroid B, which was initially at rest, travels at  $45.0^\circ$  to the direction of A.



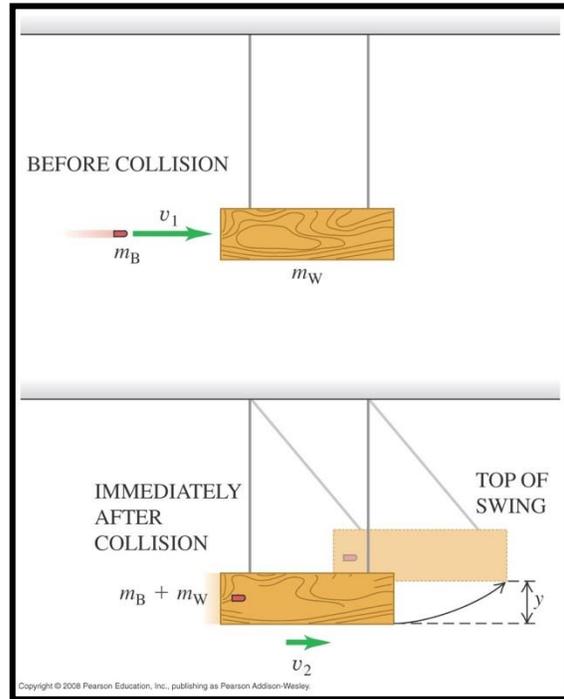
- a. Find the speed of each asteroid after the collision.

$x$	$y$
$p_{Ai}$	
$p_{Bi}$	
$p_{Af}$	
$p_{Bf}$	
$\sum p_i$	
$\sum p_f$	

- b. What kind of collision is this?
- c. What fraction of the original kinetic energy of asteroid A is lost during the collision?

3. A 12.0-g rifle bullet is fired with a speed of 380 m/s into a wood block pendulum with mass 6.00 kg, suspended from two cords 70.0 cm long. The bullet embeds in the block, and the block swings upward after impact.

- a. What kind of collision is this?
- b. Find the kinetic energy of the bullet and pendulum immediately after the bullet becomes embedded in the pendulum.



c. Find the vertical height through which the pendulum rises.

d. What fraction of the initial kinetic energy of the system is lost in the collision?