154. A 705 kg race car driven by a 65 kg driver moves with a velocity of 382 km/h right. Find the force to bring the car and driver to a stop in 12.0 s.

155. Find the stopping distance in problem 154.

156. A 50.0 g shell fired from a 3.00 kg rifle has a speed of 400.0 m/s. With what velocity does the rifle recoil in the opposite direction?

157. A twig at rest in a pond moves with a speed of 0.40 cm/s opposite a 2.5 g snail, which has a speed of 1.2 cm/s. What is the mass of the twig?

158. A 25.0 kg sled holding a 42.0 kg child has a speed of 3.50 m/s. They collide with and pick up a snowman, initially at rest. The resulting speed of the snowman, sled, and child is 2.90 m/s. What is the snowman's mass?

159. An 8500 kg railway car moves right at 4.5 m/s, and a 9800 kg railway car moves left at 3.9 m/s. The cars collide and stick together. What is the final velocity of the system?

160. What is the change in kinetic energy for the two railway cars in problem 159?

161. A 55 g clay ball moving at 1.5 m/s collides with a 55 g clay ball at rest. By what percentage does the kinetic energy change after the inelastic collision?

162. A 45 g golf ball collides elastically with an identical ball at rest and stops. If the second ball's final speed is 3.0 m/s, what was the first ball's initial speed?

163. A 5.00×10^2 kg racehorse gallops with a momentum of 8.22×10^3 kg•m/s to the west. What is the horse's velocity?

164. A 3.0×10^7 kg ship collides elastically with a 2.5×10^7 kg ship moving north at 4.0 km/h. After the collision, the first ship moves north at 3.1 km/h and the second ship moves south at 6.9 km/h. Find the unknown velocity.

165. A high-speed train has a mass of 7.10×10^5 kg and moves at a speed of 270.0 km/h. What is the magnitude of the train's momentum?

166. A bird with a speed of 50.0 km/h has a momentum of magnitude of 0.278 kg•m/s. What is the bird's mass?

167. A 75 N force pulls a child and sled initially at rest down a snowy hill. If the combined mass of the sled and child is 55 kg, what is their speed after 7.5 s?

168. A student exerts a net force of −1.5 N over a period of 0.25 s to bring a falling 60.0 g egg to a stop. What is the egg's initial speed?

169. A 1.1×10^3 kg walrus starts swimming east from rest and reaches a velocity of 9.7 m/s in 19 s. What is the net force acting on the walrus?

170. A 12.0 kg wagon at rest is pulled by a 15.0 N force at an angle of 20.0° above the horizontal. If an 11.0 N frictional force resists the forward force, how long will the wagon take to reach a speed of 4.50 m/s?

171. A 42 g meteoroid moving forward at 7.82×10^3 m/s collides with a spacecraft. What force is needed to stop the meteoroid in 1.0×10^{-6} s?

172. A 455 kg polar bear slides for 12.2 s across the ice. If the coefficient of kinetic friction between the bear and the ice is 0.071, what is the change in the bear's momentum as it comes to a stop?

173. How far does the bear in problem 172 slide?

174. How long will it take a -1.26×10^4 N force to stop a 2.30×10^3 kg truck moving at a speed of 22.2 m/s?

175. A 63 kg skater at rest catches a sandbag moving north at 5.4 m/s. The skater and bag then move north at 1.5 m/s. Find the sandbag's mass.

176. A 1.36×10^4 kg barge is loaded with 8.4×10^3 kg of coal. What was the unloaded barge's speed if the loaded barge has a speed of 1.3 m/s?

177. A 1292 kg automobile moves east at 88.0 km/h. If all forces remain constant, what is the car's velocity if its mass is reduced to 1255 kg?

178. A 68 kg student steps into a 68 kg boat at rest, causing both to move west at a speed of 0.85 m/s. What was the student's initial velocity?

179. A 1400 kg automobile, heading north at 45 km/h, collides inelastically with a 2500 kg truck traveling east at 33 km/h. What is the vehicles' final velocity?

180. An artist throws 1.3 kg of paint onto a 4.5 kg canvas at rest. The paint-covered canvas slides backward at 0.83 m/s. What is the change in the kinetic energy of the paint and canvas?

181. Find the change in kinetic energy if a 0.650 kg fish leaping to the right at 15.0 m/s collides inelastically with a 0.950 kg fish leaping to the left at 13.5 m/s.

182. A 10.0 kg cart moving at 6.0 m/s hits a 2.5 kg cart moving at 3.0 m/s in the opposite direction. Find the carts' final speed after an inelastic collision.

183. A ball, thrown right 6.00 m/s, hits a 1.25 kg panel at rest, then bounces back at 4.90 m/s. The panel moves right at 1.09 m/s. Find the ball's mass.