

PH 221 Recitation Homework Fall 2019

Chapter 03 (due week 03)

The sum of three vectors is zero. The magnitude of the first vector is twice the magnitude of the second. The first and second vectors are perpendicular. The direction of the third vector is along the negative x -axis. What are the directions of the other two vectors? There are two possible sets of answers. For both sets of answers, give the directions in standard polar form.

Chapter 02 (due week 04)

Two cars move in opposite directions toward each other on a level, straight, one-lane road. When both drivers begin to brake, their front bumpers are 275 meters apart. The smaller car is initially moving at 25.0 m/s and the larger is initially moving at 30.0 m/s. The magnitude of the acceleration of the larger car is 20.0% greater than the magnitude of the acceleration of the smaller. Determine the magnitude of acceleration for each car such that when their front bumpers touch, they have just come to rest.

Chapter 04 (due week 05)

A projectile is launched up and to the right at an angle θ above the horizontal from $(x, y) = (0, h)$ with an initial speed v_0 . (a) What is its maximum vertical position? (b) How much time does it take for the projectile to reach the x -axis after being launched? Give both answers in terms of h , θ , v_0 , and/or g . For full credit, express your answers using one simple fraction that has been factored completely.

Chapter 05 (due week 06)

A 135-kg crate is lowered at constant velocity with a rope down a frictionless ramp inclined at an angle of 30.0 degrees with the horizontal. The rope is parallel to the ramp. What are the magnitudes and directions of all of the forces acting on the crate?

Chapter 06 (due week 07)

A snowboarder slides at a constant velocity of 10.1 m/s down a snowy hill. The angle of incline is 15.0 degrees. At the bottom of the hill, she slides onto a horizontal surface. The coefficient of kinetic friction is the same for all surfaces. How much time does it take for her to slide to a halt after reaching the horizontal surface?

Chapter 07 (due week 08)

Three rectangular blocks of equal mass m slide to the right along a frictionless horizontal surface accelerated by a force F applied to the left side of the left-most block. (a) Draw a free-body diagram for each block. (b) Determine the magnitudes and directions of all of the forces on each block in terms of m , F and/or g .

Chapter 11 (due week 10)

Two objects moving perpendicularly collide and stick together. The mass of the first object is three times bigger than the mass of the second. Before they collide, the speed of the second object is 5.00 m/s and the speed of the first is 1.00 m/s. What is the speed of the two objects after they collide?