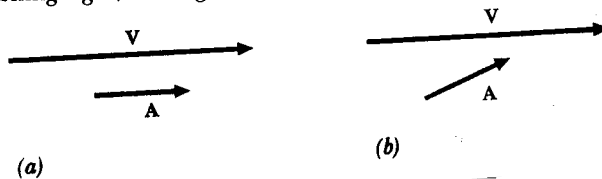


# Physics 117 HW #3 Problems

Ch 4: Q: 9, 23; E: 7, 11;  
Ch 5: Q 3, 9, 13; E: 3, 11, 19.

9. Each case below depicts an object's velocity vector and acceleration vector at an instant in time. State whether the object is (i) speeding up, slowing down, or maintaining the same speed and (ii) turning right, turning left, or moving in a straight line.



23. A hammer dropped on the surface of the Moon falls with an acceleration of 1.6 (meters per second) per second. Would its acceleration be smaller, larger, or the same if it was thrown horizontally at 6 meters per second? Why?

7. A cyclist turns a corner with a radius of 50 m at a speed of 20 m/s.

- What is the cyclist's acceleration?
- If the cyclist and cycle have a combined mass of 120 kg, what is the force causing them to turn?

11. A baseball is hit with a horizontal speed of 22 m/s and a vertical speed of 14 m/s upward. What are these speeds 1 s later?

3. Is the size of the gravitational force that Earth exerts on the Moon smaller than, larger than, or the same size as the force the Moon exerts on Earth? Why?

9. A future space traveler, Skip Parsec, lands on the planet MSU3, which has the same mass as Earth but twice the radius. If Skip weighs 800 newtons on Earth's surface, how much does he weigh on MSU3's surface?

13. In a parallel universe, there is a planet with the same mass and radius as Earth. However, when an apple is dropped on this planet, it falls with acceleration of 20 (meters per second) per second. What is the value of  $G$  in this parallel universe?

3. What is the acceleration due to gravity at a distance of 2 Earth radii above Earth's surface?

11. A 320-kg satellite experiences a gravitational force of 800 N. What is the radius of the satellite's orbit? What is its altitude?

19. A geosynchronous satellite orbits at a distance from Earth's center of about 6.6 Earth radii and takes 24 h to go around once. What distance (in meters) does the satellite travel in one day? What is its orbital velocity (in m/s)?