(1) On a miniature golf course, hole #12 pictured below requires the ball to leave a ramp at 40° from horizontal, and land on the far side of two barriers. The top of the ramp is 0.30 m above ground level. If the ball flies a total of 0.50 s in the air before striking the ground,

(a) What is the ball’s initial speed, at the top of the ramp?

(b) How far does the ball travel horizontally from the ramp before striking the ground?

(c) Choose the correct statement regarding the motion of the ball at its highest point:
   (i) The velocity and acceleration vectors both point down, the direction toward which the ball is curving.
   (ii) The acceleration vanishes at the top of the motion since the speed is unchanging.
   (iii) The velocity and acceleration vectors will be perpendicular to each other.
   (iv) The velocity of the ball will be momentarily zero at the top of the motion.
   (v) The acceleration vector will be horizontal, in the direction of motion.
(2) A rocketship is making a trip from one space station to another, in outer space (neglect gravity). For this trip the rocket starts at rest, then accelerates at 10.0 m/s$^2$ for 25 minutes, travels at constant velocity for 25 minutes, and decelerates at 10.0 m/s$^2$ for 25 minutes.

(a) Find the distance covered in the first 25 minutes of the trip.

(b) Find the total distance covered in this trip.

(c) According to the graphs below, which correctly represents the distance covered vs. time by the rocketship: (i), (ii), (iii), or (iv)? (Circle one letter in the box.)

(d) Also considering the graphs below which graph(s) include a period of negative $v_x$, with positive $a_x$? Chose one: (i), (ii), (iii), (iv), (i and iii), or (ii and iii).
3) A snowboarder travels due east at a speed of 1.5 m/s, for 5.0 s. Then, turning by 60 degrees, he travels at the same speed (1.5 m/s) for an additional 8.0 s, in a direction 60° north of east.

(a) Find the magnitude of his displacement during the first 5.0 s.

(b) Find the magnitude of his entire displacement for this process.

(c) Find the components of the average velocity, for the entire process.

(d) A skier swoops by traveling at constant speed of 2.0 m/s, oriented due north. What is the speed of the snowboarder, as observed by the skier, during the latter 8.0 s?
(5) A canoeist is traveling in the positive x direction at a constant speed of 4.0 m/s. For 3.5 seconds she paddles hard to the side so as to have a constant acceleration in the y-direction of 0.90 m/s². Find the final speed of her canoe at the end of the 3.5-second period.

(6) A circular space-station is designed so that living quarters are on the rim of a 30 meter-diameter circle, and the rotation is adjusted so that the acceleration at the rim will be that same as that due to gravity on earth.
   (a) What is the rotation period required in this situation?

   (b) What instantaneous velocity will the rim of this space-station have?