68. A fugitive tries to hop on a freight train traveling at a constant speed of 6.0 m/s. Just as an empty box car passes him, the fugitive starts from rest and accelerates at 4.0 m/s^2 to his maximum speed of 8.0 m/s. (a) How long does it take him to catch up to the empty box car? (b) What is the distance traveled to reach the box car?

75. a rocket rises vertically, from rest, with an acceleration of 3.2 m/s^2 until it runs out of fuel at an altitude of 1200 m. After this point, its acceleration is that of gravity, downward. (a) What is the velocity of the rocket when it runs out of fuel? (b) How long does it take to reach this point? (c) What maximum altitude does the rocket reach? (d) How much time (total) does it take to reach maximum altitude? (e) With what velocity does the rocket strike the Earth? (f) How long (total) is it in the air?

8. Vector V_1 is 6.6 units long and points along the negative x axis. Vector V_2 is 8.5 units long and points at 45° to the positive x axis. (a) What are the x and y components of each vector? (b) determine the sum of the vectors (magnitude and direction).

9. An airplane is traveling 735 km/h in a direction 41.5^o west of north. (a) Find the components of the velocity vector in the northerly and westerly directions. (b) How far north and how far west has the plane traveled after 3.00 h?

13. For the vectors below determine
   A = 44.0 at 28°
   B = 26.5 at 56° N of W
   C = 31 S
(a) A-B+C
(b) A+B-C
(c) C-A-B

15. The summit of a mountain, 2450 m above base camp, is measured on a map to be 4580 m horizontally from the camp in a direction 32.4^o west of north. What are the components of the displacement vector from camp to summit? What is its magnitude? Chose the x axis as east, y axis north, and z axis up.

26. A hunter aims directly at a target (on the same level) 75.0 m away. (a) If the bullet leaves the gun at a speed of 180 m/s, by how much will it miss the target? (b) At what angle should the gun be aimed so as to hit the target?

28. Show that the speed with which a projectile leaves the ground is equal to its speed just before it strikes the ground at the end of its journey, assuming the firing level equals the landing level.