1. A sheet of cardboard has length 25 inches and a width of 20 inches. Cut equal size squares out of the corners and fold it in a way in which it will create a box with maximum volume.
2. Gravel is being dumped from a conveyor belt onto the top of a conically shaped pile whose base diameter and height are always the same. If the gravel poured on at a rate of 30 ft3/min, how fast is the height of the pile increasing when the pile is 10 ft high?
3. Chuck has 20 feet of fencing and wishes to make a rectangular fence for his dog Rover. If he uses his house for one side of the fence what is maximum area?
4. A rectangular box with a square base and no top is to have a volume of 108 cubic inches. Find the dimensions for the box that require the least amount of material.
5. At noon, ship A is 100 km west of ship B. Ship A is sailing south at 35 km/h and ship b is sailing north at 25 km/h. How fast is the distance between the ships changing at 4:00 pm?
6. A kite 100 ft above the ground moves horizontally at a speed of 8 ft/sec. At what rate is the angle between the string and the horizontal decreasing when 200 ft of string has been let out?
7. A right circular cylinder is inscribed in a right circular cone so that the center lines of the cylinder and the cone coincide. The cone has a height 8 cm and radius 6 cm. Find the maximum volume possible for the inscribed cylinder.