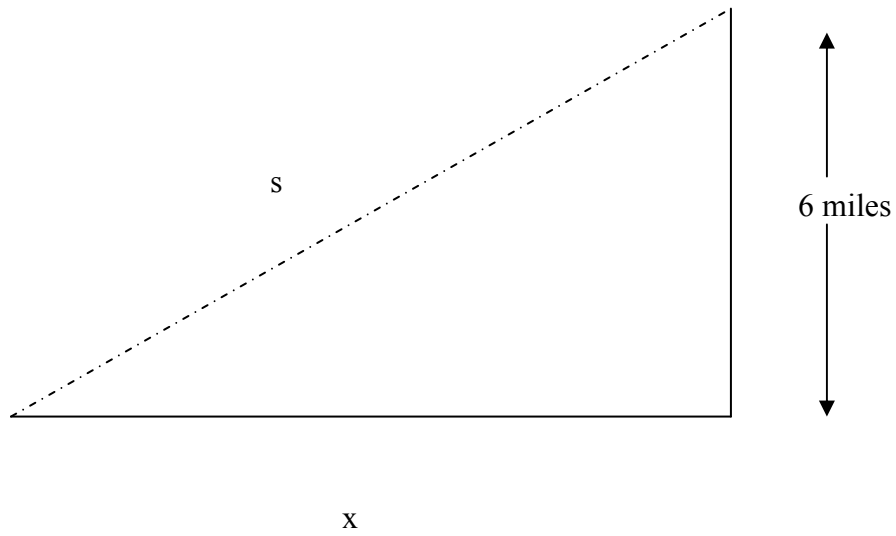


Math 180

An airplane is flying on a flight path that will take it directly over a radar tracking station. If s is decreasing at a rate of 400 miles per hour when s is 10 miles, what is the speed of the plane?



Math 180

A ladder 25 feet long is leaning against the wall of a house. The base of the ladder is pulled away from the wall at a rate of 2 feet per second.

- a) How fast is the top moving down the wall when the base of the ladder is 7 feet from the wall?
- b) Find the rate at which the angle between the top of the ladder and the wall of the house is changing when the base of the ladder is 7 feet from the wall.

Math 180

At a sand and gravel plant, sand is falling off a conveyor and onto a conical pile at the rate of 10 cubic feet per minute. The diameter of the base of the cone is 15 feet while the height of the cone is 5 feet. At what rate is the height of the pile changing when it is 4 feet high?

$$V = \frac{1}{3}\pi r^2 h$$

Math 180

Sketch the graph of

$$f(x) = \begin{cases} x^2 + 4x + 2, & x < -2 \\ 1 - 4x - x^2, & x \geq -2 \end{cases}$$

- a) Is f continuous at $x = -2$?
- b) Is f differentiable at $x = -2$? Why or why not?

Math 180

Find constants A , B , and C such that the function $y = Ax^2 + Bx + C$ satisfies the differential equation $y'' + y' - 2y = x^2$.