1 3.10: Related Rates

Idea: As certain quantities change over time, quantities which are related to them (usually via a formula) also change over time.

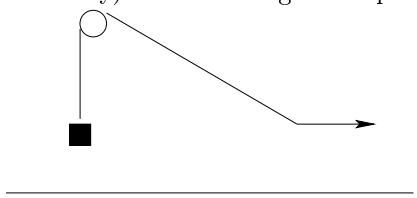
Problem Solving Strategies:

Examples:

A spherical snowball is melting at a rate of 5 cubic centimeters per minute. Assuming the snowball maintains a spherical shape, how fast is the radius changing when the radius is 4 cm?

A trough is 3 meters long and its ends have the shape of isosceles triangles that are 1 meter across the top and have a height of 30 cm. If the trough is filled with water at a rate of 100 cm^3/min, how fast is the water level rising when the water is 10 cm deep?

(On your own): A weight hangs at the end of a vertical rope attached to a pulley 8 meters above ground. A man holds the other end of the 15-meter rope at a height of 2 meters and walks away from the weight at a rate of 2 m/sec. How fast is the weight being raised when the man is 8 meters (horizontally) from the weight and pulley?



-1.6 m/sec