

Related Rates

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Example

A spherical balloon is inflating at $12\text{cm}^3/\text{s}$.
How quickly is the radius increasing when
the radius is 3cm ?

Example

Suppose one car leaves Baltimore at noon, heading due north at 40 mph, and at 1 PM another car leaves Baltimore heading due west at 60 mph. At 2PM, how quickly is the distance between them increasing?

Example

A street light is mounted at the top of a 15-foot-tall pole. A six-foot-tall man walks straight away from the pole at 5 feet per second. How fast is the distance between the pole and the tip of his shadow changing when he is forty feet from the pole?

Example

An inverted conical water tank with radius 2m and height 4m is being filled with water at a rate of $2\text{m}^3/\text{min}$. How fast is the water rising when the water level is 3m high in the tank?

Example

A lighthouse is located three kilometers away from the nearest point P on shore, and its light makes four revolutions per minute. How fast is the beam of light moving along the shoreline 1 kilometer from P ?