

3.9 Related Rates

Marius Ionescu

10/20/2010

Example: ladder

Example

A ladder 10 ft long rests against a vertical wall. If the bottom of the ladder slides away from the wall at a rate of 1 ft/s, how fast is the top of the ladder sliding down the wall when the bottom of the ladder is 6 ft from the wall?

Example

The radius of a sphere is increasing at a rate of 4mm/s . How fast is the volume increasing when the diameter is 80 mm ?

Example: snowball

Example

If a snowball melts so that its surface area decreases at a rate of $1 \text{ cm}^2/\text{min}$, find the rate at which the diameter decreases when the diameter is 10 cm .

Example

A baseball diamond is a square with side 90 ft. A batter hits the ball and runs toward first base with a speed of 24 ft/s.

- 1 At what rate is his distance from the second base decreasing when he is halfway to first base?
- 2 At what rate is his distance from third base increasing at the same moment?

Example: curve

Example

A particle is moving along the curve $y = \sqrt{x}$. As the particle passes through the point $(4, 2)$, its x -coordinate increases at a rate of 3 in/s. How fast is the distance from the particle to the origin changing at this instant?