3.9 Related Rates

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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: sphere

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 are decreases at a rate of 1 cm^2/min, find the rate at which the diameter decreases when the diameter is 10cm.

Example: baseball

Example

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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?