## What is a related rates problem?

## **Quick Check**

Use implicit differentiation to find the derivative of the equation given below.

$$x^2 + 9y^2 - 4x + 3y = 0$$

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## An inflating balloon

Air is being pumped into a spherical balloon so that its volume increases at a rate of  $100 \frac{cm^3}{s}$ . How fast is the radius of the balloon increasing when the diameter is 50cm.

- Understand the given and unknown quantities.
- 2 Introduce notation and make a labeled sketch to understand the situation.
- 3 Look for an equation to connect the given and unknown quantities/ rates of change.
- **4** Solve for the required rate of change.

A pebble is dropped into a calm pond, causing ripples in the form of concentric circles. The radius r of the outer ripple is increasing at a constant rate of 1 foot per second. When the radius is 4ft, at what rate is the total area A of the disturbed water changing?

## Sliding ladder 目

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

Intersection of two roads 🚓

Car A is traveling west at 50mi/h and car B is traveling north at 60mi/h. Both are headed for the intersection of two roads. At what rate are the cars approaching each other when car A is 0.3mi and car B is 0.4mi from the intersection?

Continue practice on handout 🔁

Explore the corresponding geogebra animations for different related rates scenarios posted as resources for the lesson on <u>Reprimethinker.com</u>