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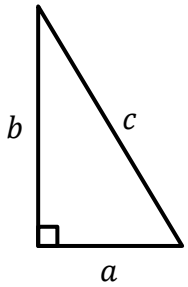
MATH 2301 GW24: Related Rates #3



Two cars leave an intersection at the same time.

Anxious Andy's car is driving east at a speed of 15 miles/hour.

Breakneck Betty's car is driving north at a speed of 20 miles/hour.

The goal is to find the rate at which the distance between the cars is increasing at the instant 2 hours after the cars left the intersection, in units of miles per hour.

(a) Find an equation relating quantities a, b, c. (Work with letters, not numbers.) Call this Equation 1.

(b) Identify which of the quantities a, b, c depends on time.

(c) Take the derivative $\frac{d}{dt}(\quad)$ of both sides of Equation 1, using Implicit Differentiation (using the chain rule where necessary). The result will be a *new equation* involving quantities a, b, c as well as the derivatives of any of the quantities that depend on time. Call this Equation 2.

The Group Work continues on back ➔

(d) Solve Equation 2 for $\frac{dc}{dt}$.

(e) Substitute in known quantities and known derivatives, along with their correct units. (If there are any quantities that you need that you are not given, you'll have to figure out the values of those quantities.) Simplify the numbers and simplify the units.