1. Two cars start from the same point. One travels due south at 60 mph and the other travels due west at 25 mph. At what rate is the distance between them increasing two hours later?

(a) Picture and variables:

(b) Numerical values:

(c) Unknown value(s) to solve for:

(d) Equation(s) relating variables:

(e) Derivatives of equation(s) using chain rule:

(f) Solve for the unknown(s):
2. A spherical balloon is inflated with helium at the rate of \(100 \text{ ft}^3/\text{min}\). How fast is the balloon’s radius increasing at the instant the radius is 5 ft? How fast is the surface area increasing?

(a) Picture and variables:

(b) Numerical values:

(c) Unknown value(s) to solve for:

(d) Equation(s) relating variables:

(e) Derivatives of equation(s) using chain rule:

(f) Solve for the unknown(s):
3. The altitude of a triangle is increasing at a rate of 1cm/min while the area of the triangle is increasing at a rate of 2cm²/min. At what rate is the base of the triangle changing when the altitude is 10cm and the area is 100cm²? At what rate is the perimeter of the triangle changing with these same values?

(a) Picture and variables:

(b) Numerical values:

(c) Unknown value(s) to solve for:

(d) Equation(s) relating variables:

(e) Derivatives of equation(s) using chain rule:

(f) Solve for the unknown(s):