

# Product Rule Problem #1

1. Suppose that you are changing the size of a image on your computer by dragging the top right corner of the image. Say that the bottom left corner of the image is at the origin.
  - (a) If the position of the top right corner of the image is given by the functions  $x = f(t) = 5 + 2t$  and  $y = g(t) = 7 + 3t$ , what is the initial size of the image?
  - (b) What is the area of the image at time  $t$ ?
  - (c) How fast is the width of the image changing at time  $t$ ?
  - (d) How fast is the height of the image changing at time  $t$ ?
  - (e) Draw a picture demonstrating the size of the picture at  $t = 1$  and  $t = 2$ . Find the difference in the two areas.
  - (f) Draw a picture demonstrating the size of the picture at  $t$  and  $t + h$ . Find the difference in the two areas.
  - (g) Divide the equation from the previous problem by  $h$  and take the limit as  $h$  goes to 0. What do you get?