

## 2.6 The Chain Rule

If  $f(x) = \sqrt{x}$  and  $g(x) = 3x + 1$ , then what is  $f(g(x))$ ?

What is the derivative of  $f(g(x))$ ?

The Chain Rule will help us to differentiate composite functions.

### The Chain Rule

Given the composite function  $h(x) = f(g(x))$ , where  $f(x)$  and  $g(x)$  are differentiable functions:

$$h'(x) =$$

In other words, to differentiate a composite function (when one function is “trapped inside” another function), follow these steps:

- 1.
- 2.

Find the derivative of  $y = \sqrt{3x + 1}$

If  $y = (x^2 - x + 2)^8$ , find  $\frac{dy}{dx}$

Differentiate  $s = \left(\frac{2t-1}{t+2}\right)^6$

Find the derivative of the function  $f(x) = (x^2 + 1)^3 (2 - 3x)^4$