

**MA 180 CHAPTER 4: Exponential and LOGARITHMIC FUNCTIONS**  
**SECTION 4.1: COMPOSITE FUNCTIONS**

**Example 1:** Suppose we throw a rock in a pond creating a wave which is a ring (circle). It is determined that the radius of the ring is increasing by 1 foot every second. Find a formula for the area of the ring after  $t$  seconds.

**Example 2**

Suppose  $f(x) = x^3 - 2x$  and  $g(x) = \sqrt{x-1}$

a)  $(f \circ g)(1)$

b)  $(g \circ f)(-1)$

c)  $(g \circ g)(26)$

d) Find  $(f \circ g)(x)$  and find the domain of it.

e) Find  $(g \circ f)(x)$  and find the domain of it

**Example 3** If  $f(x) = \frac{1}{x+1}$  and  $g(x) = \frac{2}{x-3}$  Find the domain of  $(f \circ g)(x)$

**Example 4** If  $f(x) = 2x - 5$  and  $g(x) = \frac{1}{2}(x + 5)$

Show that  $(f \circ g)(x) = (g \circ f)(x) = x$

**Example 5** Given  $H(x) = \sqrt{x^2 - 1}$

Find functions  $f$  and  $g$  such that  $(f \circ g)(x) = H(x)$