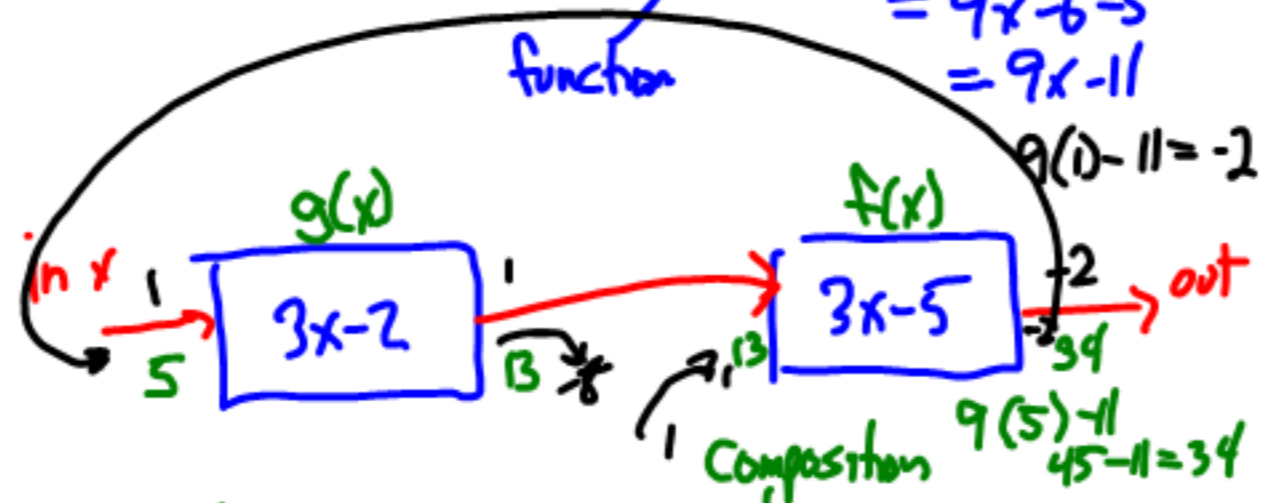


Section 4.8 Composition of functions

- What is it?
- what is the notation?
- how do we do it?

$$f(x) = 3x - 5$$

find $f(3x-2) = 3(3x-2) - 5$
 $= 9x - 6 - 5$
 $= 9x - 11$



Composition of functions

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

does order matter?

$$f(x) = 2x + 9$$

$$g(x) = x^2 - 3$$

$$f \circ g(4) = f(g(4)) = f(4^2 - 3) = f(16 - 3) = f(13)$$
$$2(13) + 9 = 26 + 9 = 35$$

$$g \circ f(4) = g(f(4)) = g(2(4) + 9) = g(17) = 17^2 - 3 = 286$$

$$f \circ g(x) = f(g(x)) = f(x^2 - 3) = 2(x^2 - 3) + 9$$
$$= 2x^2 - 6 + 9 = 2x^2 + 3$$

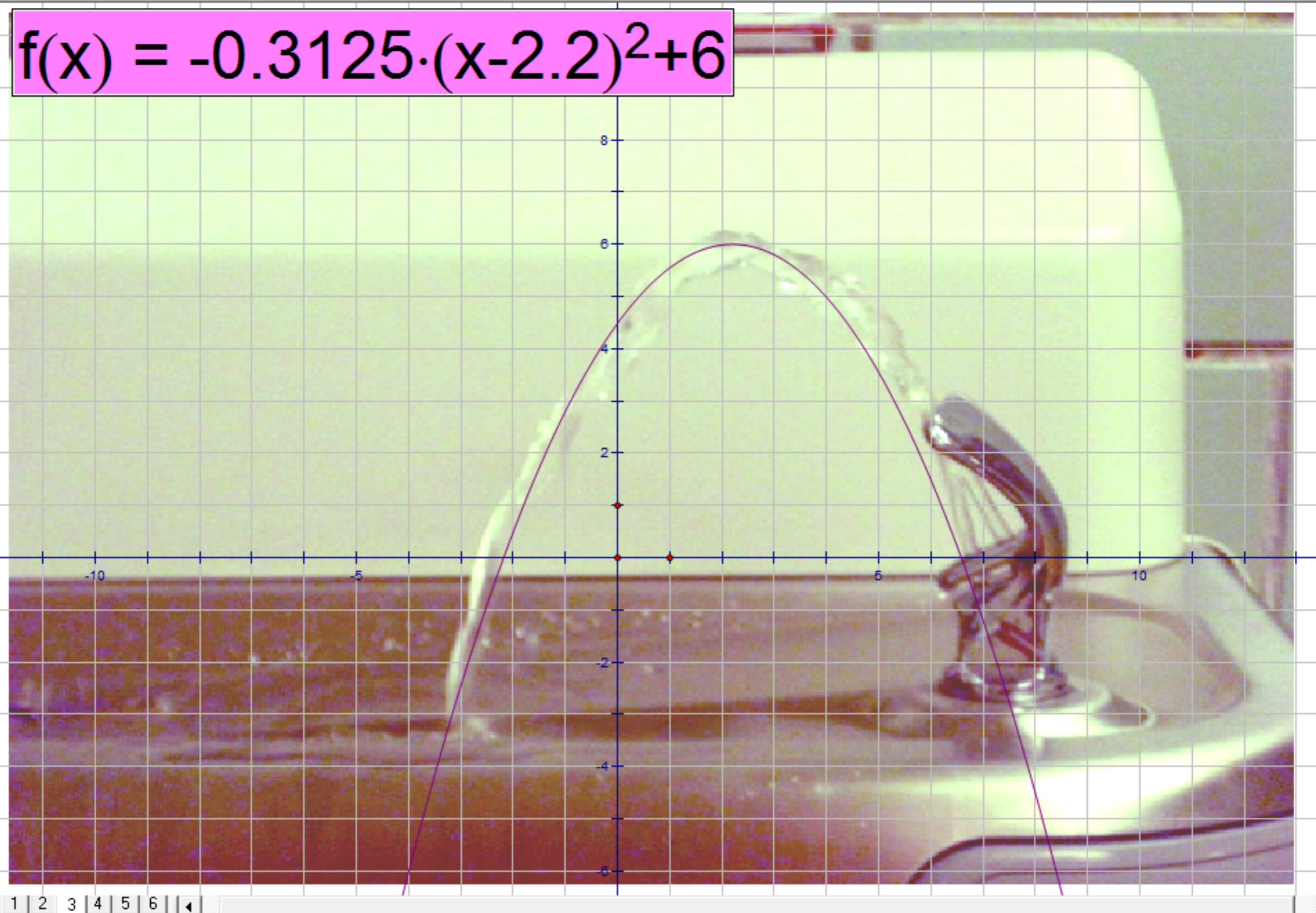
$2(4)^2 + 3 = 2(16) + 3$
 $32 + 3 = 35$

$$g \circ f(x) = g(f(x)) = g(2x + 9)$$
$$g(f(x)) = (2x + 9)^2 - 3$$
$$(2x + 9)(2x + 9) - 3$$
$$4x^2 + 18x + 18x + 81 - 3$$
$$4x^2 + 36x + 78$$

$4(4)^2 + 36(4) + 78$

$[g(x) = x^2 - 3]$
 $x = (2x + 9)$

$$f(x) = -0.3125 \cdot (x - 2.2)^2 + 6$$

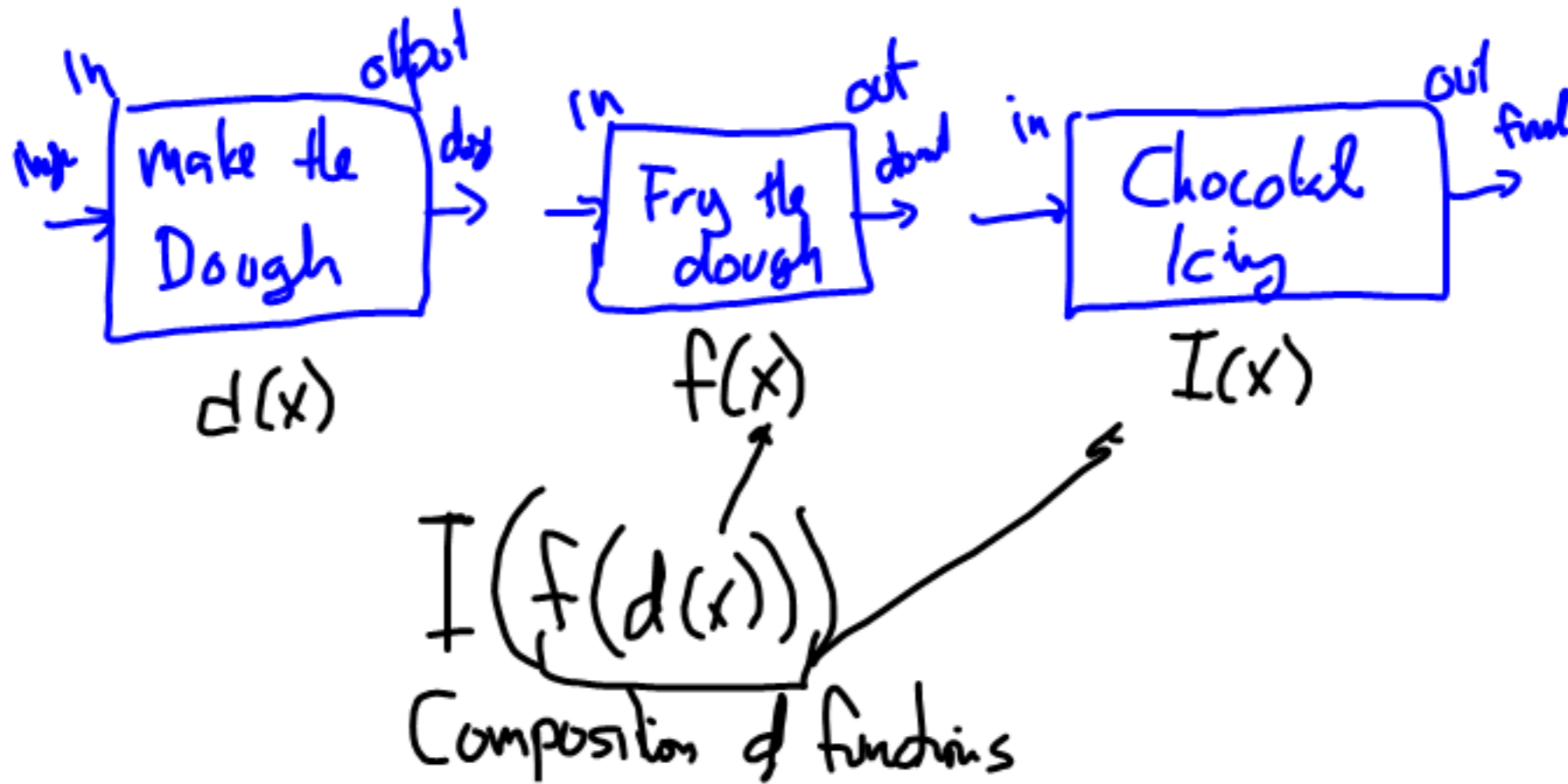


1 2 3 4 5 6

Drag or Select Picture

Section 4.8 Composition of functions

- What is it?
- What is the notation?
- How do I do it?



$$f(x) = 3x - 5$$

find $f(3x - 2)$ input

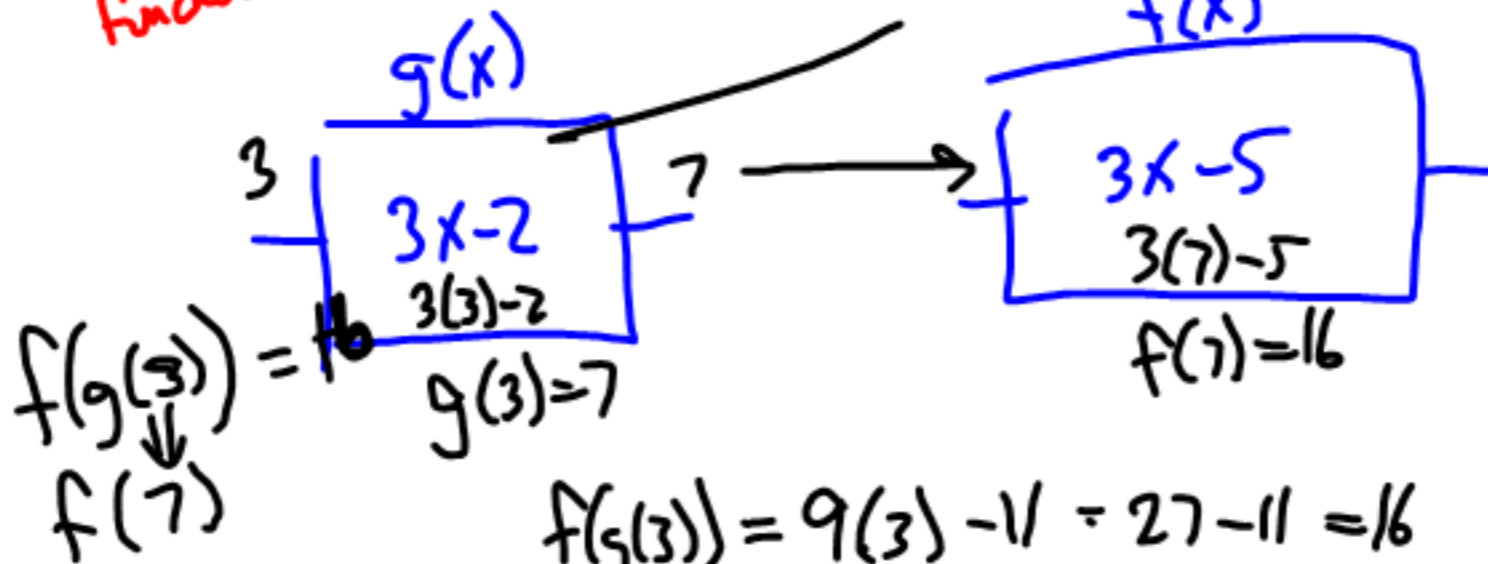
$$3(3x - 2) - 5 = 9x - 6 - 5$$
$$f(3x - 2) = 9x - 11$$

$$f(x) = 3x - 5$$

$$g(x) = 3x - 2$$

Composition
of
Functions

find $f(g(x)) = f(3x - 2) = 9x - 11$



$$p(x) = 2x + 5$$

$$r(x) = x^2 - 1$$

$$p(\underline{r(x)}) = p(x^2 - 1)$$

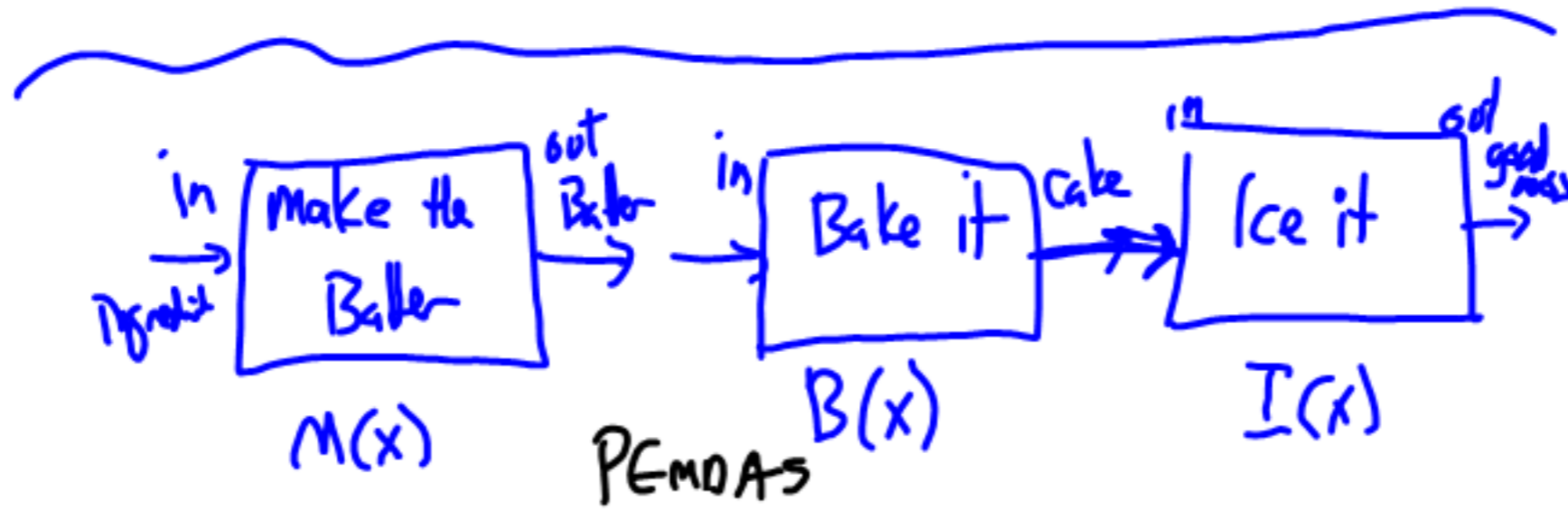
$$2(x^2 - 1) + 5$$

$$2x^2 - 2 + 5$$

$$p \circ r = p(r(x)) = 2x^2 + 3$$

Section 4.6 Composition of functions

- What is it?
- What is the notation?
- How do I do it?



$$I \circ B \circ M = I(B(M(x)))$$

composition

function notation

Composition of functions

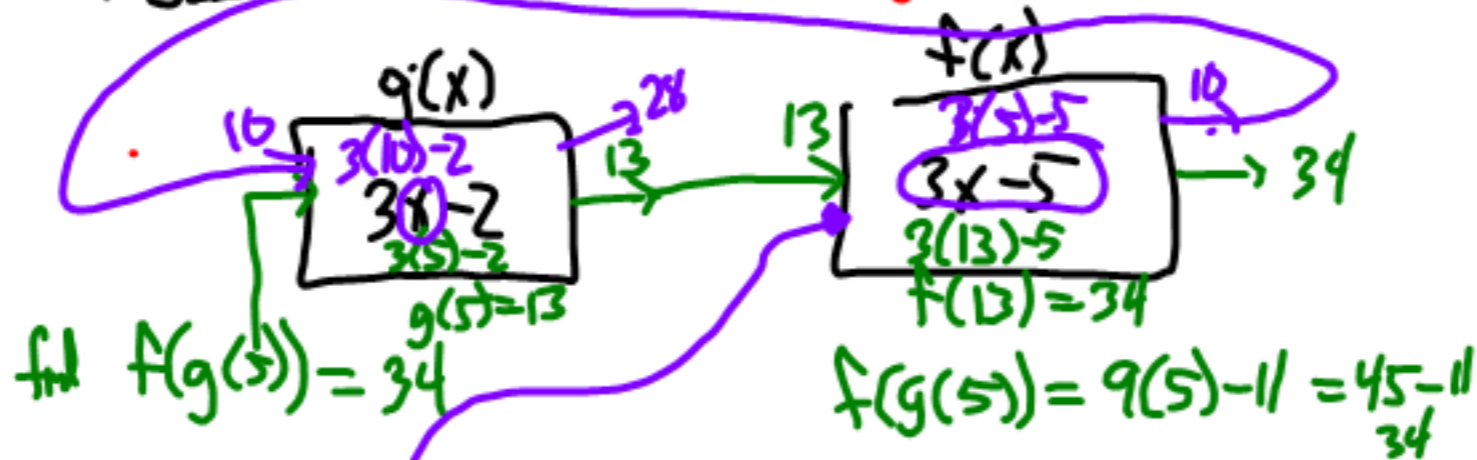
$$f(x) = 3x - 5 \quad g(x) = 3x - 2$$

find $f(g(x)) = f(3x - 2)$

$$3(3x - 2) - 5 = 9x - 6 - 5$$

$$f(g(x)) = 9x - 11$$

$f(g(x))$



$$f(g(5)) = 34$$

$$f(g(5)) = 9(5) - 11 = 45 - 11 = 34$$

$$g(f(5)) = 28$$

$$g(f(x)) = 9x - 17$$

$$g(3x - 5) = 3(3x - 5) - 2 = 9x - 15 - 2 = 9x - 17$$