

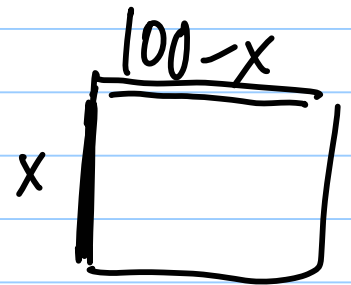
# Hw #53, Section 2.1

200 ft used to enclose a rectangular area

$$A = x(100 - x)$$

$$A(x) = x(100 - x)$$

$$A(x) = 100x - x^2$$



b) Max Area → Find the vertex

$(h, k)$   
 ↗ width ↘ Area

$h = \frac{-b}{2a}$ , using this value of  $h$ , find

$$a = -1 \quad b = 100$$

49, Section 2.2:  $S = 100 + 96t - 16t^2$

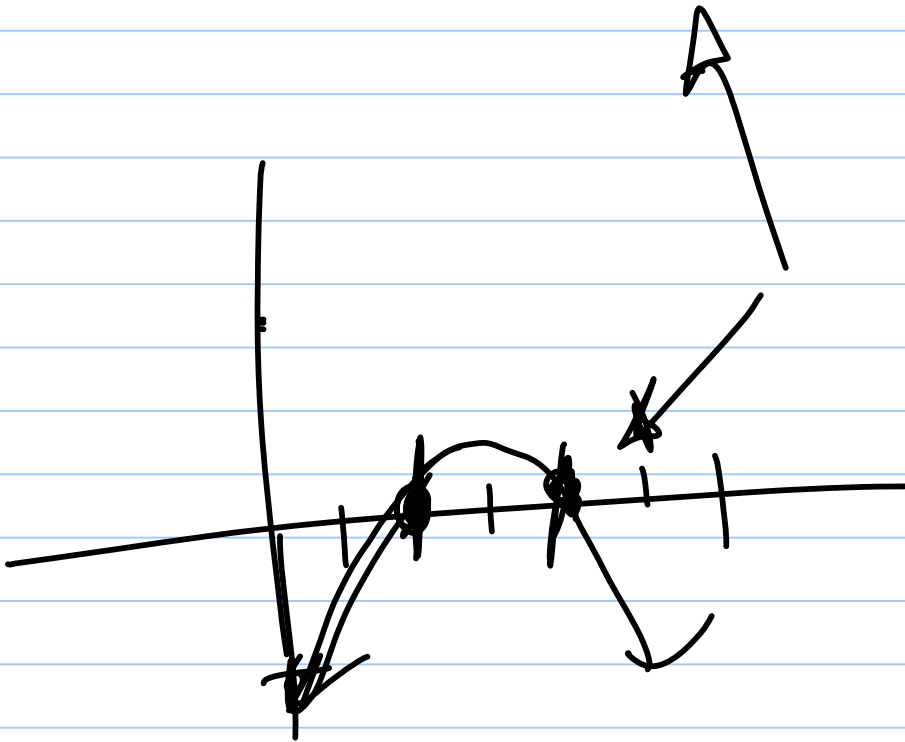
~~49~~  $228 = 100 + 96t - 16t^2$

$$0 = -16t^2 + 96t - 128$$

$$0 = -16(\underline{t^2 - 6t + 8})$$

$$0 = -16( \quad )( \quad )$$

Quadratic  
factoring Q.F.



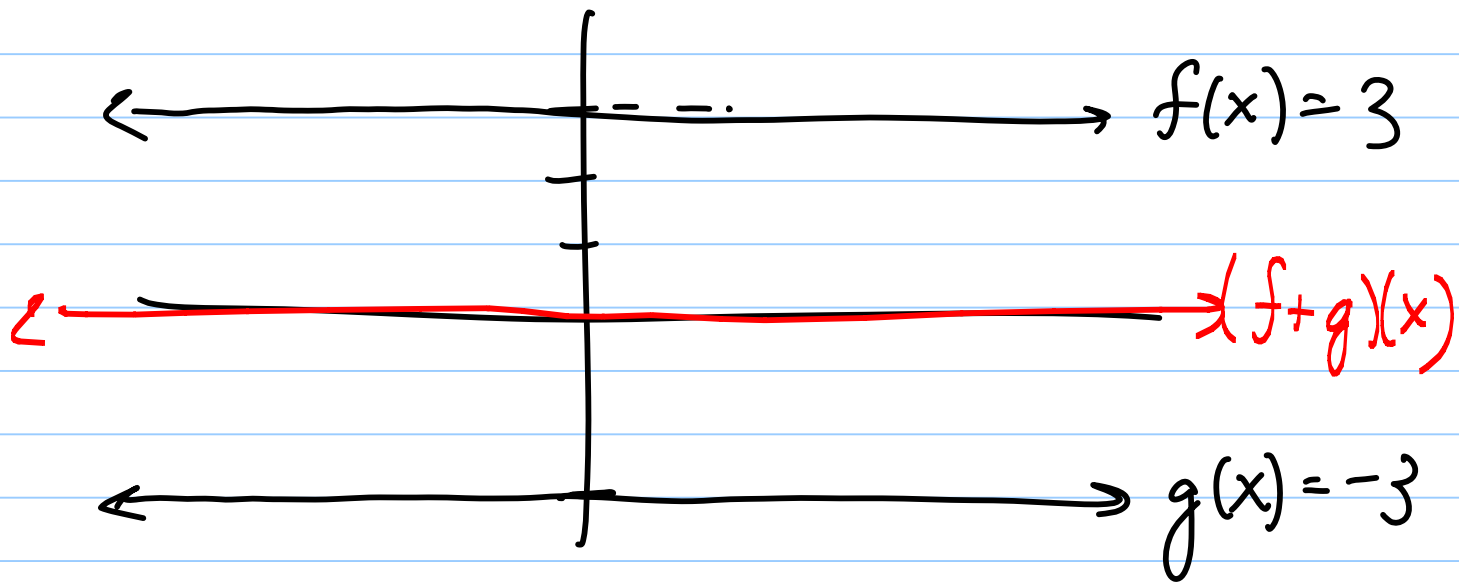
$$\underline{\text{C \#1}} \cdot (2x-5)(4x+12)$$

$$8x^2 + 24x - 20x - 60$$

$$= 8x^2 + 4x - 60$$

$$h = \frac{-b}{2a} = \frac{-4}{2(8)} = \frac{-4}{16} = \begin{bmatrix} -1 \\ 4 \end{bmatrix} (C)$$

<sup>+, -, x, ÷</sup>  
2.6 / Combining Functions



What is  $f(x) + g(x)$ ?

Ex) Given  $f(x) = 2x^2 + 6x + 5$

$$g(x) = 3x^2 - 2x + 5$$

a) Find  $f(x) + g(x) = \boxed{5x^2 + 4x + 10}$

b) Find  $f(x) - g(x) =$

$$2x^2 + 6x + 5 - (3x^2 - 2x + 5)$$

$$= 2x^2 + 6x + 5 - 3x^2 + 2x - 5$$

$$= \boxed{-x^2 + 8x}$$

When would you subtract functions?

$$\text{Profit} = \text{Revenue} - \text{Cost}$$

$$P(x) = R(x) - C(x)$$

IC #2:

$$R(x) - C(x)$$

$$350x - (1000 + 26x + x^2)$$

$$350x - 1000 - 26x - x^2$$

$$\boxed{-1000 + 324x - x^2} \quad \text{Quadratic}$$

# Multiplying Functions

Given  $f(x) = 2x^2 + 6x + 5$

$g(x) = 3x^2 - 2x + 5$

	$2x^2$	$6x$	$5$
$3x^2$	$6x^4$	$18x^3$	$15x^2$
$-2x$	$-4x^3$	$-12x^2$	$-10x$
$5$	$10x^2$	$30x$	$25$

Combine Like Terms

Answer:  $6x^4 + 14x^3 + 13x^2 + 20x + 25$

# Composition of Functions

$$\text{Given } f(x) = x^2 + 2x$$

$$a) f(2) = 2^2 + 2(2) = 8 \quad (2, 8)$$

$$b) f(\text{🐰}) = \text{🐰}^2 + 2 \text{🐰} \quad (\text{🐰}, \text{🐰}^2 + 2\text{🐰})$$

$$c) f(x+3) = (x+3)^2 + 2(x+3)$$

$$= x^2 + 6x + 9 + 2x + 6$$

$$= \boxed{x^2 + 8x + 15}$$

"Composition"

Ex] Given  $h(x) = 2x + 3$

$$g(x) = 3x^2 - 2x + 5$$

Find  $g(h(x))$ .

$$g(\underline{\underline{2x+3}}) = 3 \left[ \underline{\underline{2x+3}} \right]^2 - 2(2x+3) + 5$$

Simplify:

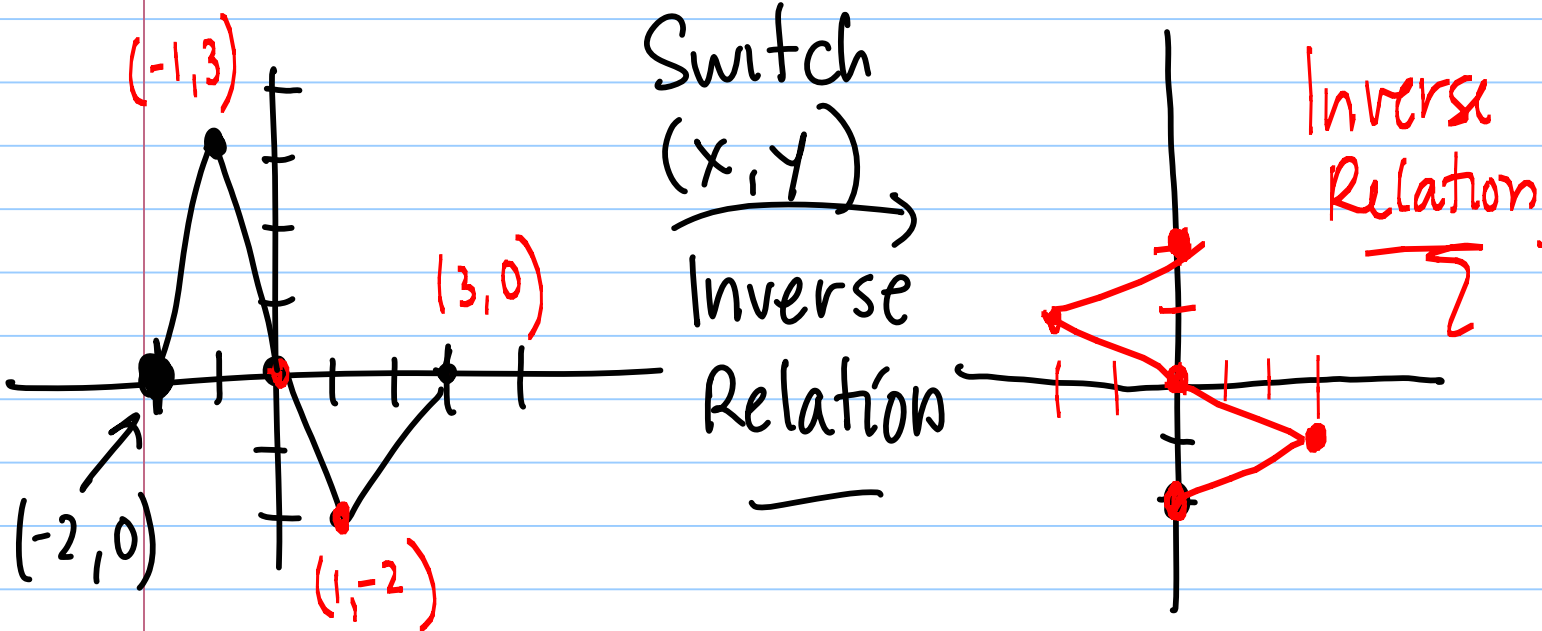
$$3 \left[ (2x+3)(2x+3) \right] - 4x - 6 + 5$$

$$3 \left[ 4x^2 + 12x + 9 \right] - 4x - 6 + 5$$

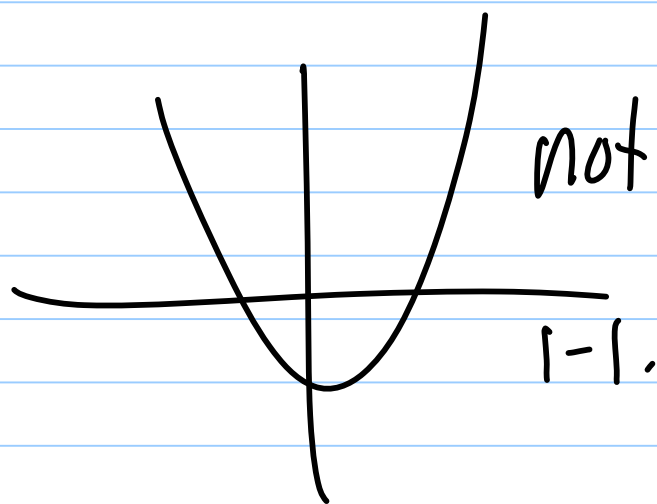
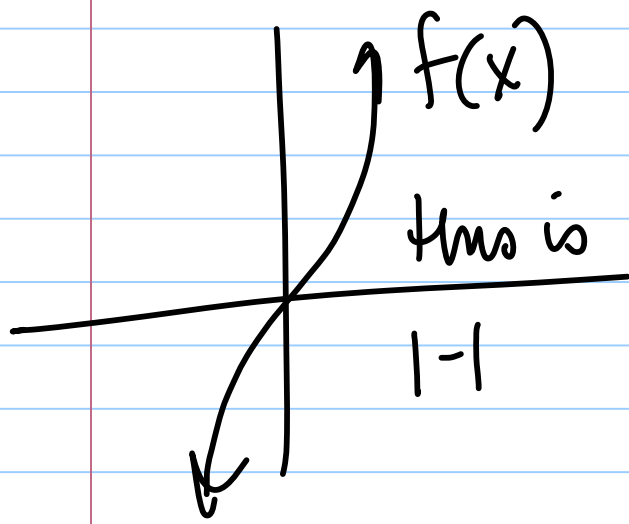
$$= 12x^2 + 36x + 27 - 4x - 6 + 5$$

$$= (12x^2 + 32x + 26)$$

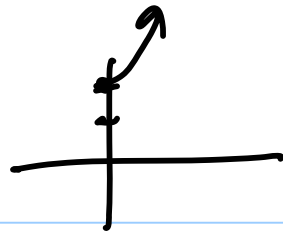
# 2.7/ Inverting Functions



\* For a function  $f(x)$  to have an inverse,  $f(x)$  must be "1-1"  
(that is also a function)  
( $f(x)$  must pass the horizontal line test)



# How to find Inverses:



Given:  $t(x) = x^2 + 2$ ,  $x \geq 0$

① Change the function label to "y"

$$y = x^2 + 2$$

② Switch input/output variables

$$x = y^2 + 2$$

③ Solve for y

$$x = y^2 + 2$$

$$\sqrt{x-2} = \sqrt{y^2}$$

$$\sqrt{x-2} = y$$

④ Rename y with  $t^{-1}(x)$ .

$$t^{-1}(x) = \sqrt{x-2}$$

