Solving a quadratic eq'n:

$$ax^2+bx+c=0$$

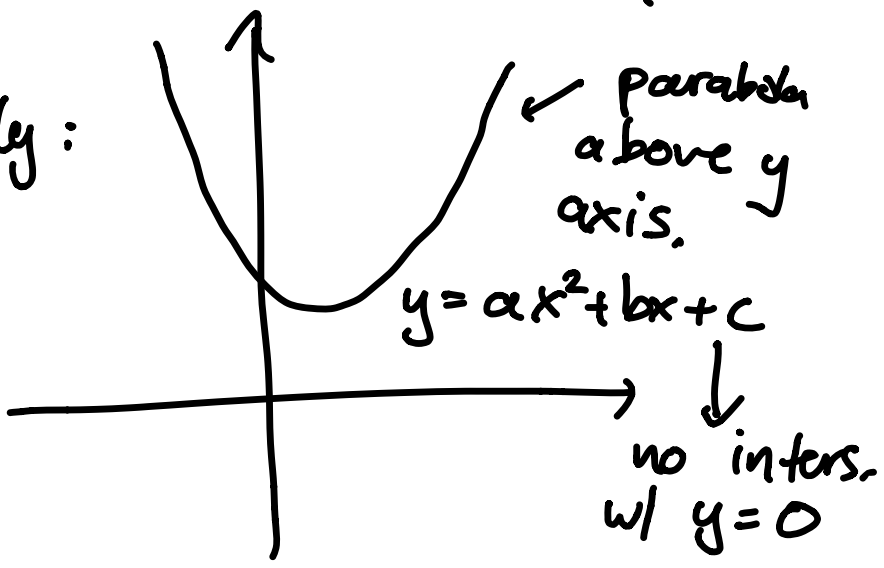
Number of sols:

If $b^2-4ac>0$: 2 sols

$b^2-4ac=0$: 1 sol.

$b^2-4ac<0$: no sol's real

graphically:

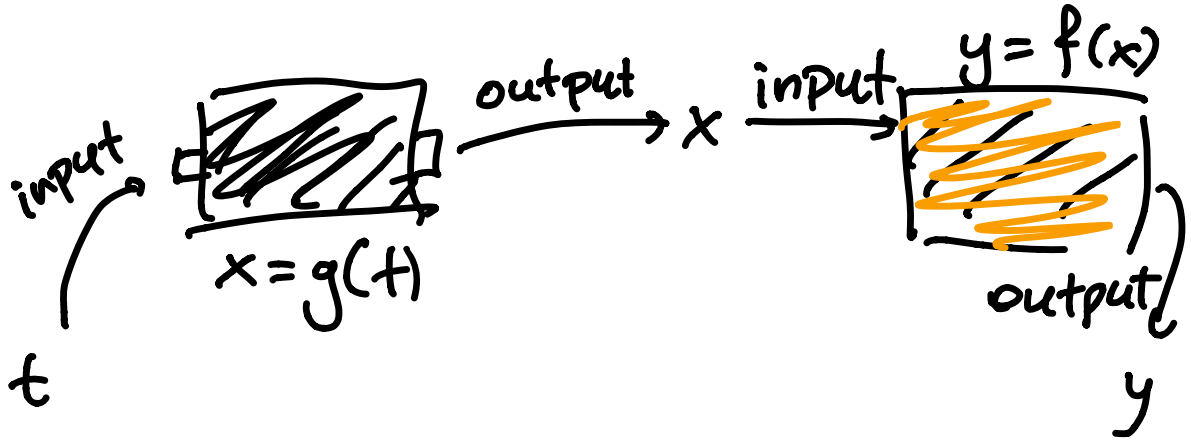


$3\frac{1}{2}$ means $3\cdot\frac{1}{2}=\frac{3}{2}=1.5$

won't use mixed fractions!

Chapter 8.

Composition: Idea: operation applied to 2 functions that produces a third function.



Procedure is called composition of functions g and f, produces a function

$$h(t) = f(g(t))$$

In practice:

$x = g(t) = 2t^2 + t$

$y = f(x) = 4x$

Replace any occurence of x in $y = f(x)$ with $g(t)$:

$$y = 4x = 4(2t^2 + t)$$
$$= 8t^2 + 4t$$

Good: produce more complicated functions out of simple ones.

Also other way round: break complicated into simple:

$$y = \frac{1}{(x-3)^2 + 4}$$

$$\downarrow$$

$$y = \frac{1}{z^2 + 4} = f(z) \;;\; z = x - 3 = g(x)$$

$$y = f(g(x))$$

Bad notation

$$y = f(x) \qquad y = g(x)$$

Make sense of $f(g(x))$:
Replace every occurence of x in $y = f(x)$ with $g(x)$.

Ex:

$$y = f(x) = x^2 + 2$$

$$y = g(x) = x + 2$$

$$f(g(x)) = (g(x))^2 + 2$$

$$= (x+2)^2 + 2$$

$$= x^2 + 4x + 4 + 2$$

$$= x^2 + 4x + 6.$$

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

$$= x^2 + 2 + 2$$

$$= x^2 + 4$$

They're different!

$$f(g(x)) \neq g(f(x))$$