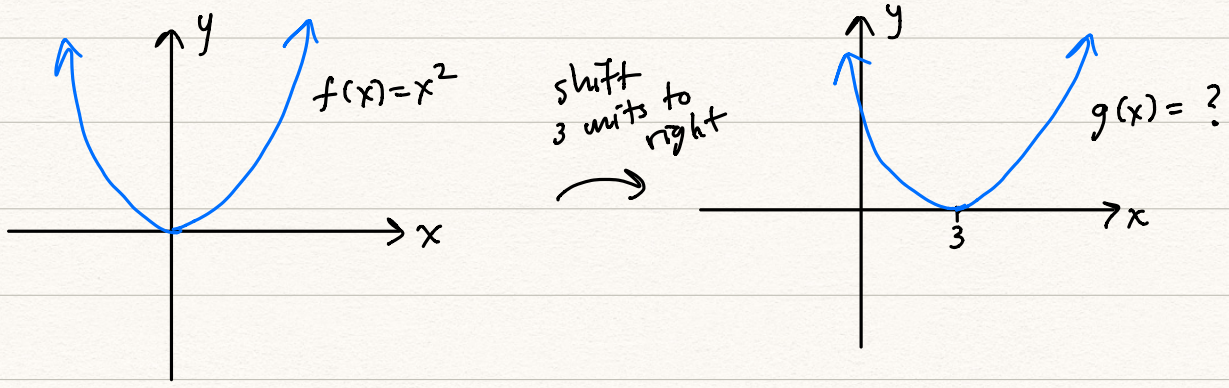
2.7 - Transformation of Functions



I Shifting:

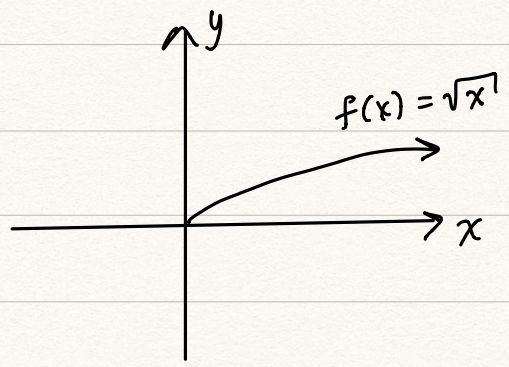
- To shift to the left by a units, replace x with x+a.
- " _____ " right by b units, replace x with x−a.

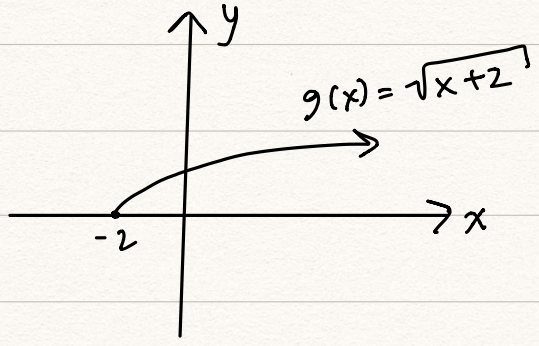
Ex ① Shift $f(x) = x^2$ 3 units to the right.

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

② Shift $f(x) = \sqrt{x}$ 2 units to the left.

$$y = \sqrt{x}$$
$$y = \sqrt{x+2}$$
So $g(x) = \sqrt{x+2}$ is the equation of the graph where we shift the graph of $f(x)$ 2 units to the left.





- To shift upwards by a units, replace y by y-a
- " ——— " downwards by b units, replace y by y+b.

* Always solve for y *

Ex: ① Shift $f(x) = x^3$ 5 units down.

$$y = x^3$$
$$y + 5 = x^3$$
$$y = x^3 - 5$$

So $g(x) = x^3 - 5$