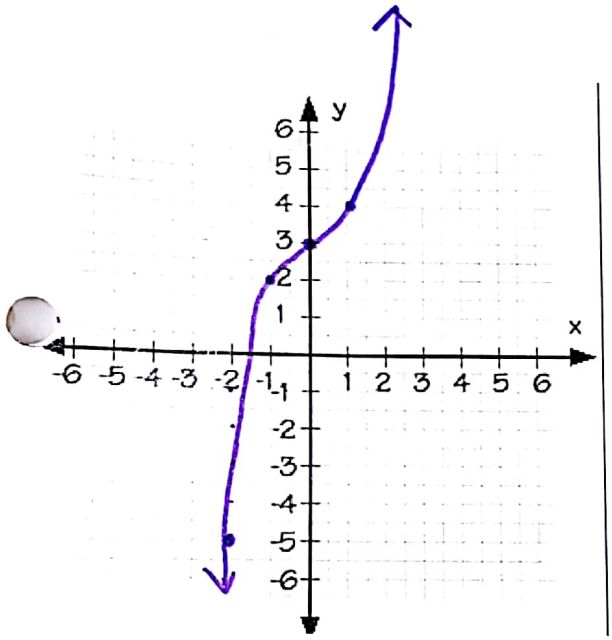
Section 1.6 Graphical Transformations

KNOW THE GRAPHS OF EACH PARENT FUNCTION

1) Sketch the following graphs

a) $h(x) = x^3 + 3$

up 3



$y = x^3$

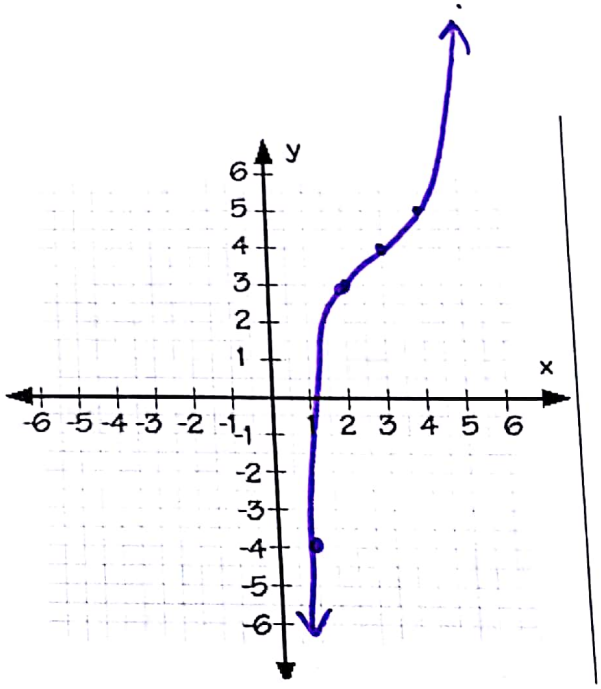
x	y
-2	-8
-1	-1
0	0
1	1
2	8

→

x	y+3
-2	-5
-1	2
0	3
1	4
2	11

b) $f(x) = (x-3)^3 + 4$

right 3 up 4



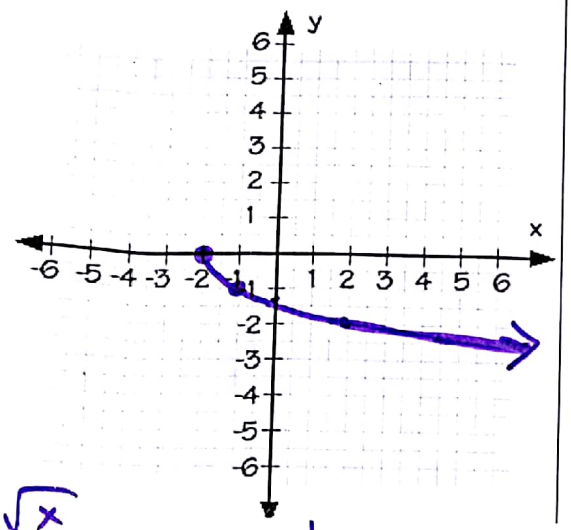
$y = x^3$

x	y
-2	-8
-1	-1
0	0
1	1
2	8

x+3	y+4
1	-4
2	3
3	4
4	5
5	12

c) $g(x) = -\sqrt{x+2}$

reflect over x axis ↑ ; Left 2 ↑



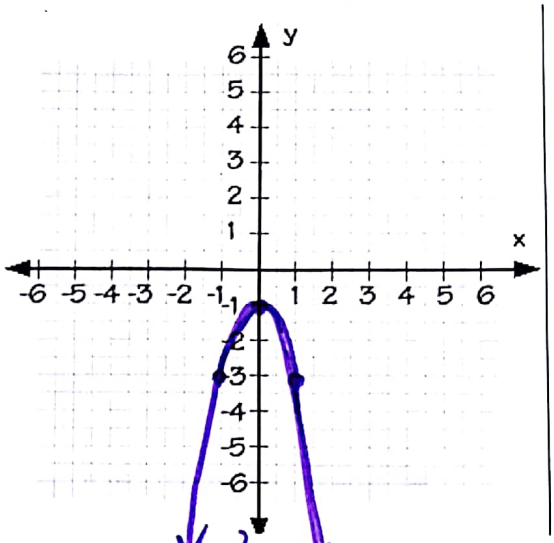
$y = \sqrt{x}$

x	y
0	0
1	1
2	1.4
4	2

x−2	−y
−2	0
−1	−1
0	−1.4
2	−2

d) $k(x) = -2x^2 - 1$

vertical stretch ↓ ; reflect over x axis ↑ ; down 1 ↑



$y = x^2$

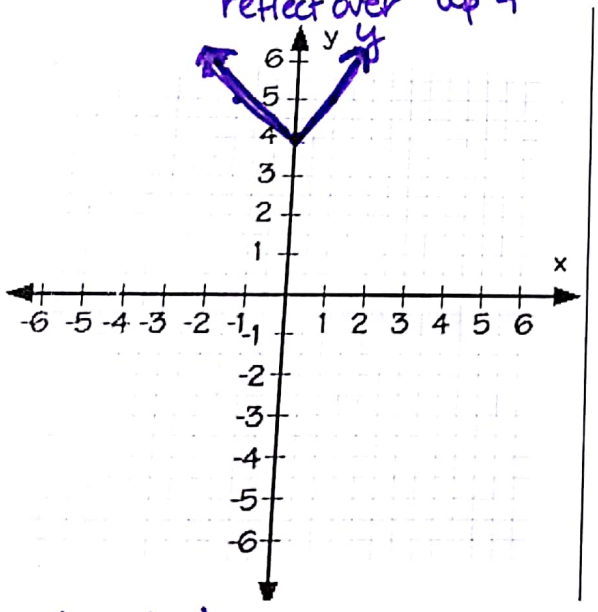
x	y
−2	4
−1	1
0	0
1	1
2	4

→

x	−2y − 1
−2	−9
−1	−3
0	−1
1	−3
2	−9

e) $m(x) = |-x| + 4$

reflect over y ↑ ; up 4 ↑



$y = |x|$

x	y
−2	2
−1	1
0	0
1	1
2	2

→

−x	y+4
2	6
1	5
0	4
−1	5
−2	6

$y = |x|$ ∨

$y = x^2$ ∪

$y = \sqrt{x}$ ⊂

$y = x^3$

State the parent function and describe the transformations of the following functions

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

$y = x^2$

vertical stretch by a factor of 3

$(x, y) \rightarrow (x, 3y)$

$$h(x) = |3x|$$

$y = |x|$

horizontal shrink by a factor of $\frac{1}{3}$ $(x, y) \rightarrow (\frac{1}{3}x, y)$

$$f(x) = \sqrt{-x+3} \qquad \sqrt{-(x-3)}$$

must factor negative 1st!

$y = \sqrt{x}$

- reflection over y-axis
- RIGHT 3 units

$(x, y) \rightarrow (-(x-3), y)$

$$k(x) = -(x-2)^3 + 3$$

$y = x^3$

- reflection over x-axis
- Right 2
- Up 3

$(x, y) \rightarrow (x+2, -y+3)$