ROOTS

$i = \sqrt[2]{-1}$

$2^4 = 16$
$3^4 = 81$
$4^4 = 256$

$\overset{\text{index}}{\sqrt[2]{25}} = 5 \quad \cancel{-5}$

$\sqrt{8} \quad \overset{-2 \cdot -2 \cdot -2}{= -2}$

$\sqrt[2]{-49} = 7i$

$\sqrt[4]{-81} = \text{not poss. b6.}$

$\sqrt{24} = \sqrt{4 \cdot 6} = 2\sqrt{6}$

$\sqrt[3]{40} = \sqrt[3]{8 \cdot 5} = 2\sqrt[3]{5}$

$\sqrt[4]{162} = \sqrt[4]{81 \cdot 2} = 3\sqrt[4]{2}$

$\sqrt[6]{3645} = \sqrt[6]{729 \cdot 5} = 3\sqrt[6]{5}$

729
$\cdot 5$

3^6

$$\sqrt[2]{a^2} = |a|$$

$$\sqrt[2]{a^4} = a^2$$
$$a^2 \cdot a^2$$

$$\sqrt[2]{y^6} = |y^3|$$
$$y^3 \cdot y^3$$

$$\sqrt[5]{z^{20}} = z^4$$

$$\sqrt{x^2 + 8x + 16}$$
$$= \sqrt{(x+4)(x+4)}$$
$$\overset{even}{= \sqrt[2]{(x+4)^{2}}} \; even$$
$$= |(x+4)| \; odd$$

Add
abs
value = $\dfrac{even}{index}$ — $\dfrac{even}{\substack{exponent \\ inside \\ root}}$ — $\substack{odd \\ exponent \\ outside \\ root}$
When

$$\sqrt[4]{a^8 b^{28} c^{100}} = a^2 |b^7 c^{25}|$$
even   even

$$\sqrt[6]{a^{36} b^{42} c^{96}} = a^6 b^7 c^{16}$$
$$= a^6 c^{16} |b^7|$$

$$\sqrt[2]{x^7} = \sqrt[2]{x^6 \cdot x^1} = x^3 \sqrt[2]{x^1}$$

$$\sqrt[3]{x^7 y^{11}} = x^2 y^3 \sqrt[3]{x y^2}$$
odd

$$\begin{array}{r} 3 \\ 2{\overline{\smash{\big)}\,7}} \\ \underline{-6} \\ 1 \end{array}$$

$$\sqrt[4]{x y^6} \cdot \sqrt[4]{x^3 y^7} = \sqrt[4]{x^4 y^{10}}$$
even   even   even   odd   even

$$= x y^2 \sqrt[4]{y^2}$$

squrabola
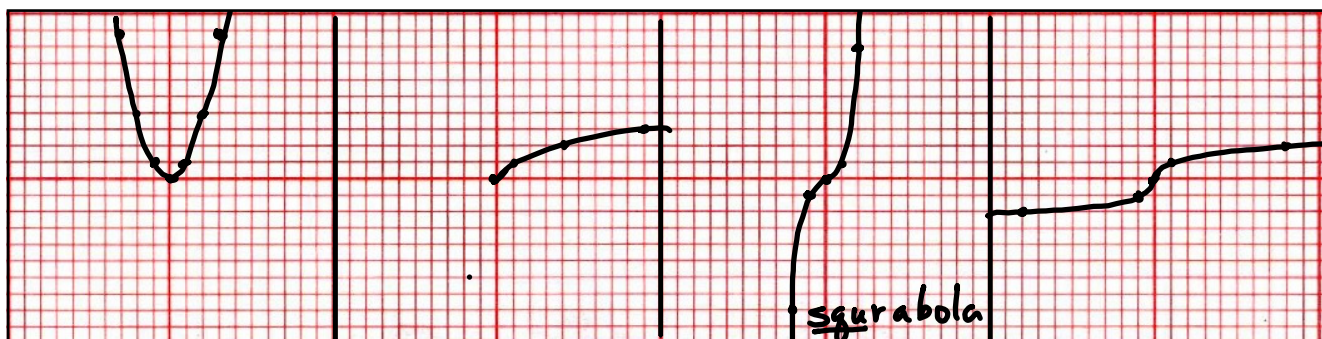
$y = x^2$

0	0
1	1
2	4
3	9

$y = \sqrt{x}$

x	y
0	0
1	1
4	2
9	3

$y = x^3$

0	0
-1	-1
-2	-8
3	27

$y = \sqrt[3]{x}$

0	0
-1	-1
-8	2
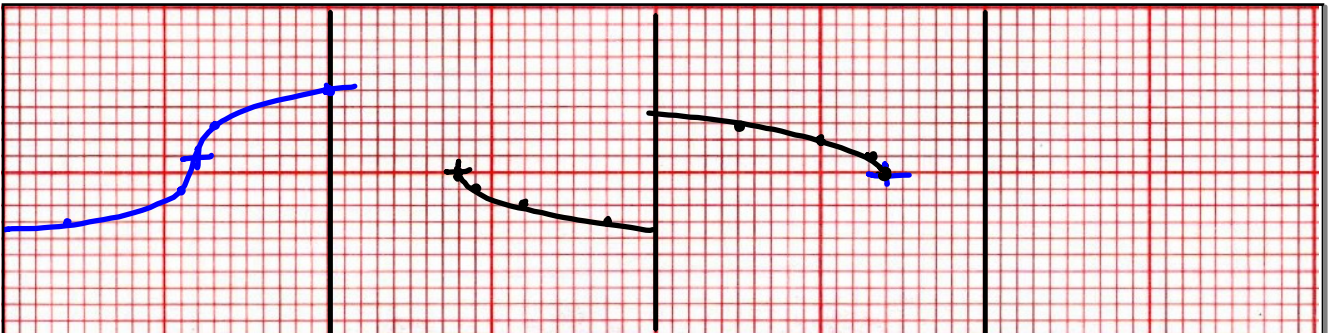
$y = 2\sqrt[3]{x-2} + 1$

Right   Up
  2   1

0	0
1	$\frac{+}{2}$ 2
8	2 4

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

left
2

0	0
1	1 -1
4	2 -2
9	3 -3

$y = \sqrt{4-x}$

$y = \sqrt{-(x-4)}$

0	0
-1	1
-4	2
-9	3

← x can't be
negative

* pull out
  a — to
  reverse
  the Sign