Rational & Radical equations & graphs.

Recall:

$$\sqrt{x} = x^{1/2}$$

$$\sqrt[3]{x} = x^{1/3}$$

$$\sqrt[4]{x} = x^{1/4}$$

A: $\left(\sqrt{x+1} = 3\right)^2$ Square Both sides

$x+1 = 9$

$\boxed{x = 8}$ Check this!

$\left(\sqrt{x+18} = x-2\right)^2$ $(x-2)(x-2)$

$x+18 = x^2 - 4x + 4$

$-1x \quad -18 \qquad -1x \quad -18$

$x^2 - 5x - 14 = 0$

$(x-7)(x+2) = 0$

$x = 7 \qquad x = -2$

Check: $\sqrt{7+18} = 7-2$ | $\sqrt{-2+18} = -2-2$

$\sqrt{25} = 5$ | $\sqrt{16} = -4$

Check: $\sqrt{7+18} = 7-2$

$\sqrt{25} = 5$

$5 = 5$ ✓

$\sqrt{-2+18} = -2-2$

$\sqrt{16} = -4$

$X = 7$

$$\left(\sqrt{35x} = 5\sqrt{x+2}\right)^2$$

$35x = 25(x+2)$

$35x = 25x + 50$

$10x = 50$

$x = 5.$

Check:

$\sqrt{35(5)} = 5\sqrt{7}$

$\sqrt{5 \cdot 7 \cdot 5}$ ↓

$\sqrt{5 \cdot 5}\sqrt{7} = 5\sqrt{7}$ ✓

$5\sqrt{7}$ ✓

$$\left((3x-1)^{1/4} = 2\right)^4$$

$3x - 1 = 16$

Check

$(3(17)-1)^{1/4}$

$3x-1=16$

$3x=17$

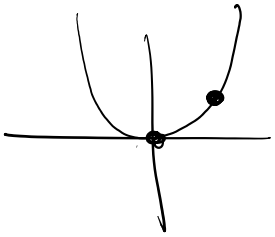
$x=\frac{17}{3}$

$\left(3\left(\frac{17}{3}\right)-1\right)^{1/4}$

$(17-1)^{1/4}$

$(16)^{1/4}=2$ ✓

Recall:

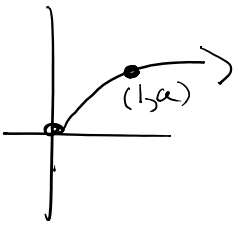


$y=a(x-h)^2+k$

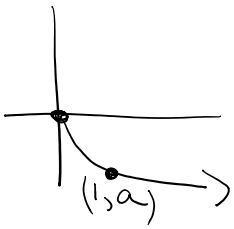
movement $\uparrow a$

Vertex (h,k)

$y=\sqrt{x}$

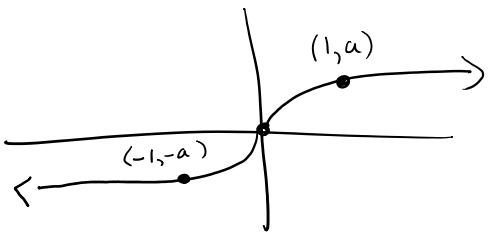


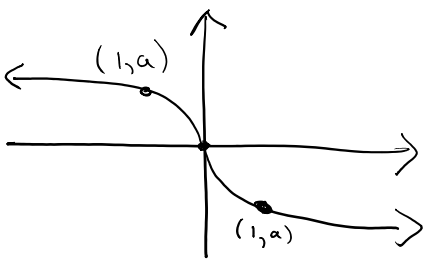
$y=-\sqrt{x}$



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

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

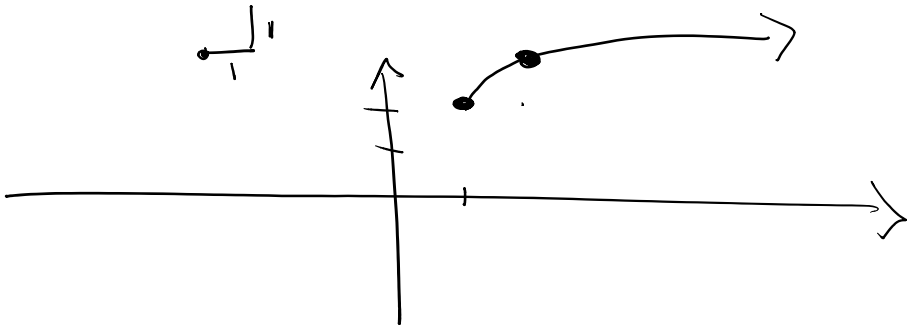




$y = \sqrt{x-1} + 2$

$a = 1$

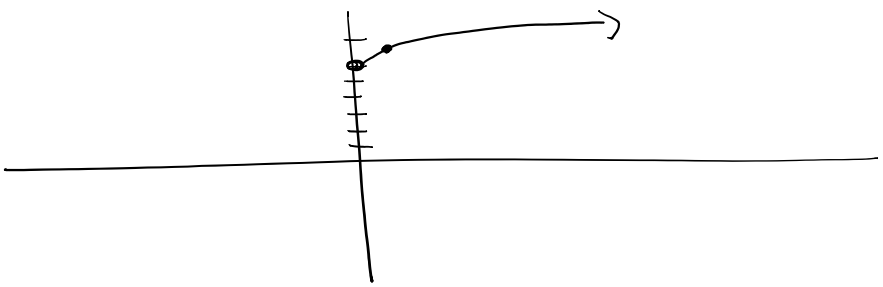
vtx $(1, 2)$



$y = \frac{1}{2}\sqrt{x} + 6$

vtx: $(0, 6)$

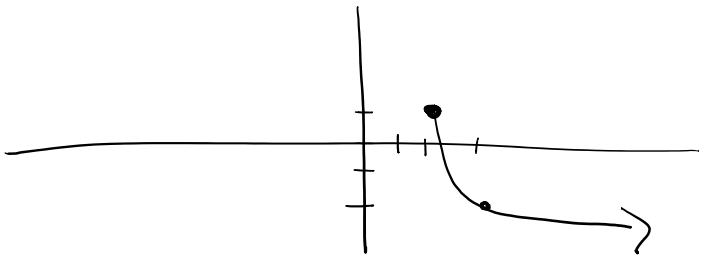
$a = 1/2$



$y = -3\sqrt{x-2} + 1$

vtx: $(2, 1)$

$a = -3$



$$y = 2\sqrt[3]{x+1} + 4$$

vtx $(-1, 4)$

a: 2