The 4 moves

1. Vertical stretch
2. Horizontal stretch
3. Horizontal shift
4. Vertical shift

$2\sqrt{-7x+21} - 11$

$2\sqrt{x}$

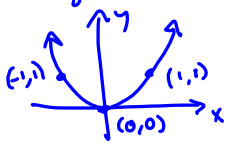
$2\sqrt{-7x}$

$2\sqrt{-7(x-3)}$

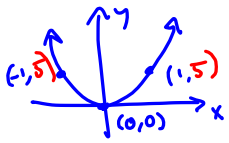
$2\sqrt{-7(x-3)} - 11$

$-7(x-3)$

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



① $5x^2 = 5y = 5f(x)$

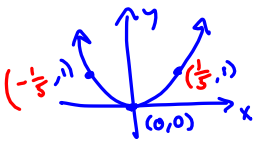


Replaced y by 5y

② $(5x)^2$ ← $(5\cdot\frac{1}{5})^2 = 1^2$

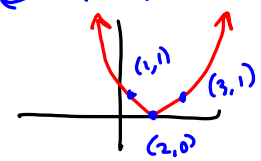
Replaced x by 5x

Divide x's by 5

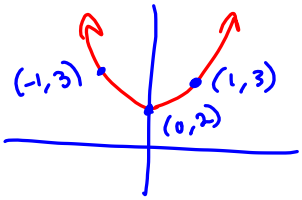


③ $(x-2)^2$ Replace x by x−2

Add 2 to x's

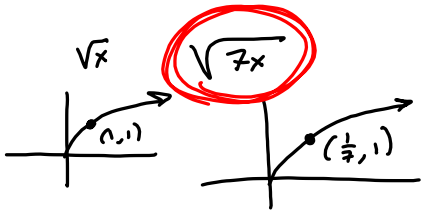


④ $x^2 + 2$ Replace $y = x^2$ by $y+2 = x^2+2$ up 2



People get messed up by stuff like

$\sqrt{7x+21}$



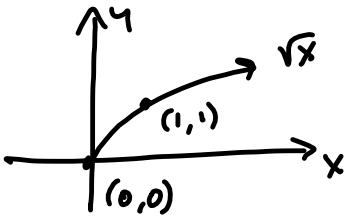
There's no "more" for replacing 7x by 7x+21. Only moves are replacing y by something or x by something

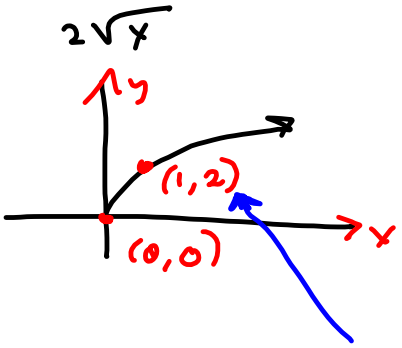
$\sqrt{7x+21}$ left 21?

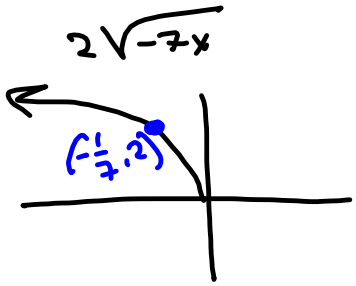
No

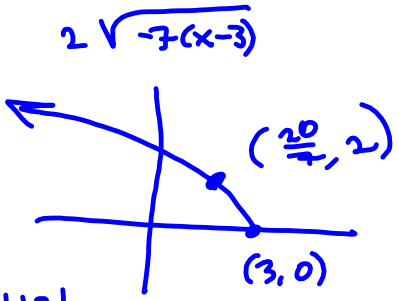
$\sqrt{7(x+3)}$

Left 3 to go from $\sqrt{7x}$ to $\sqrt{7x+21}$





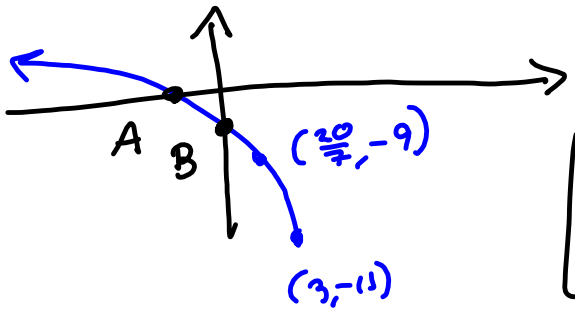




$-\frac{1}{7} + \frac{3}{1}\cdot\frac{7}{7} = \frac{-1+21}{7} = \frac{20}{7}$

$2\sqrt{-7x+21} - 11$

$2\sqrt{-7(x-3)} - 11$



$g(0) = 2\sqrt{21} - 11$

$\approx$ < 0 i.e., negative.

$A = \left(-\frac{37}{28}, 0\right)$

$B = (0, 2\sqrt{21} - 11)$

A: $g(x) = 0$

$2\sqrt{-7x+21} - 11 = 0$

$2\sqrt{-7x+21} = 11$

$\sqrt{-7x+21} = \frac{11}{2}$

$\left(\sqrt{-7x+21}\right)^2 = \left(\frac{11}{2}\right)^2$

$-7x + 21 = \left(\frac{11}{2}\right)^2 = \frac{11^2}{2^2} = \frac{121}{4}$

$-7x = \frac{121}{4} - \frac{21}{1}\cdot\frac{4}{4} = \frac{121 - 84}{4} = \frac{37}{4}$

$x = \frac{\frac{37}{4}}{-7} = \left(\frac{37}{4}\right)\left(-\frac{1}{7}\right) = -\frac{37}{28}$