

$$g(x) = -2 \left(\frac{1}{3}x + 1 \right)^3 + 5 \quad \frac{1}{3}(x+3) = \frac{1}{3}(x+3)$$

$a f(b(x-c)) + d$
 ↑ Vert. stretch (x, ay)
 ↑ Hor. stretch $(\frac{1}{b}x, y)$
 ↑ Hor. shift Right 'c' $(x+c, y)$
 ↑ Vert. Shift. up d. $(x, y+d)$

$$g(x) = -2 \left(\frac{1}{3}(x+3) \right)^3 + 5$$

① $f(x) = x^3$

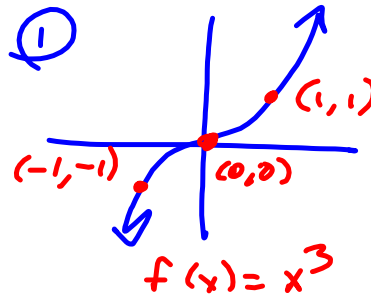
② $f(\frac{1}{3}x)$

③ $-2 f(\frac{1}{3}x)$

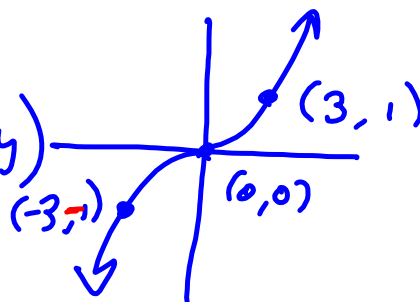
④ $-2 f(\frac{1}{3}(x+3))$

⑤ $-2 f(\frac{1}{3}(x+3)) + 5$

② $(x, y) \rightarrow (\frac{x}{\frac{1}{3}}, y) = (3x, y)$



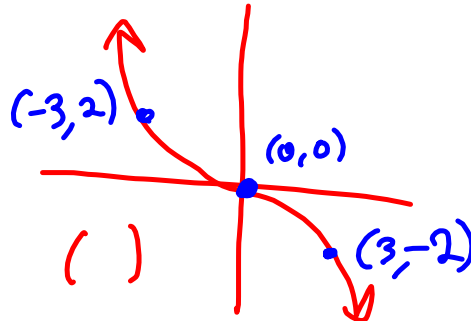
② $f(\frac{1}{3}x) = (\frac{1}{3}x)^3$



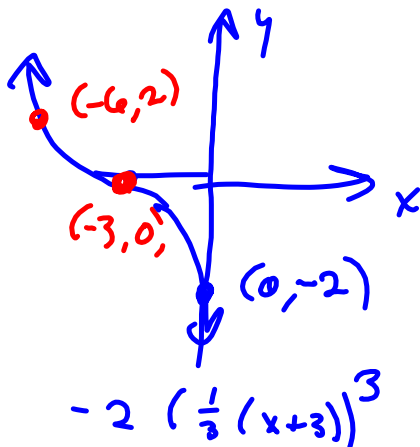
③ $(x, y) \mapsto (x, -2y)$

③ $-2 f(\frac{1}{3}x) = -2 (\frac{1}{3}x)^3$

④ $(x, y) \mapsto (x+3, y)$



④ $-2 f(\frac{1}{3}(x+3))$



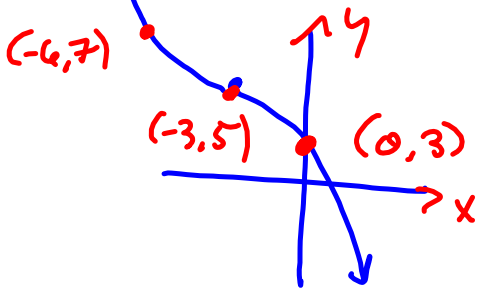
$5 \sqrt{-3x+6} - 7$

$= 5 \sqrt{-3(x-2)} - 7$

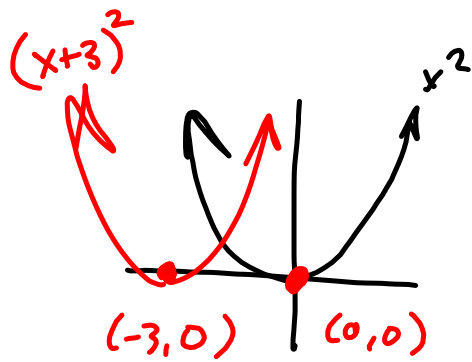
$\sqrt{x} \xrightarrow{(-\frac{1}{3}x, y)} \sqrt{-3x} \xrightarrow{(x, 5y)} 5 \sqrt{-3x}$

⑤ $-2 f(\frac{1}{3}(x+3)) + 5 \rightarrow 5 \sqrt{-3(x-2)} \quad (x+2, y)$

$= -2 (\frac{1}{3}(x+3))^3 + 5 \rightarrow 5 \sqrt{-3(x-2)} - 7 \quad (x, y-7)$



$(x, y) \mapsto (x, y+5)$



$$x+3=y$$

$$y=x$$

$$(x+3)^2$$