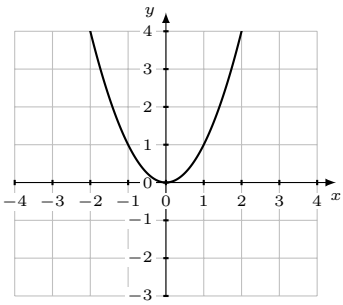
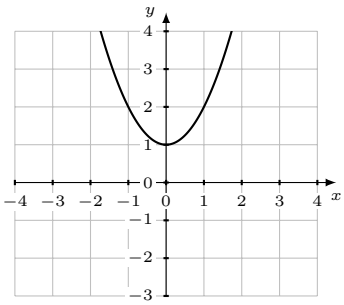
Verschiebungen

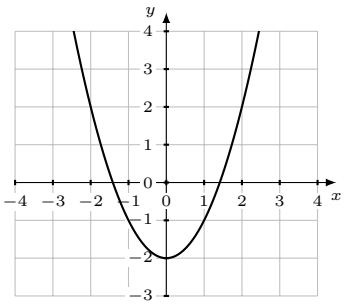
1. **Vertikale Verschiebungen.** Wird zu einer bestehenden Funktion ein konstanter Wert, d.h. eine fixe Zahl, addiert, so verschiebt sich der Funktionsgraph um diesen Wert entlang der y-Achse nach oben.



$f(x) = x^2$

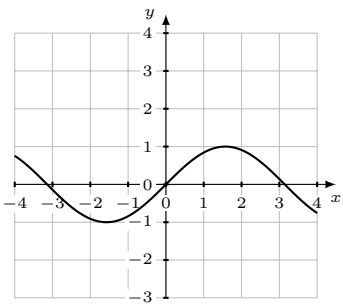


$f(x) = x^2 + 1$

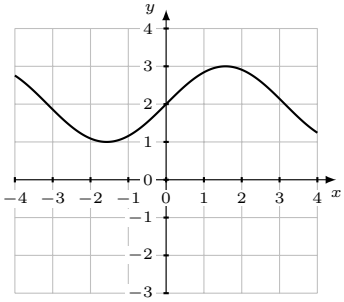


$f(x) = x^2 - 2$

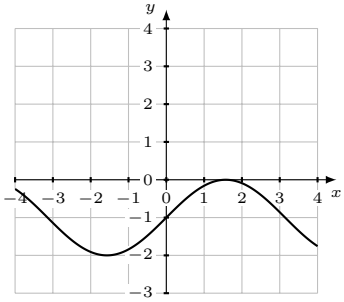
Geben Sie die Funktionsgleichung der verschobenen Funktionen an:



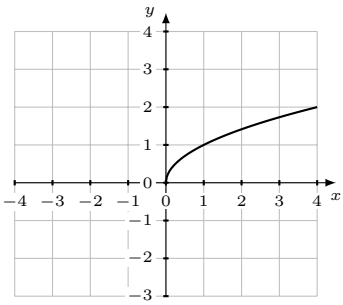
$f(x) = \sin(x)$



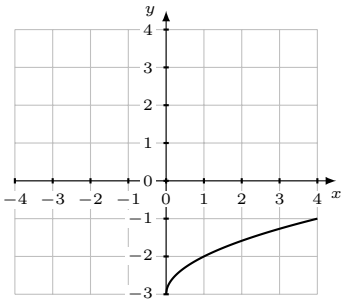
$f(x) = \sin(x) + 2$



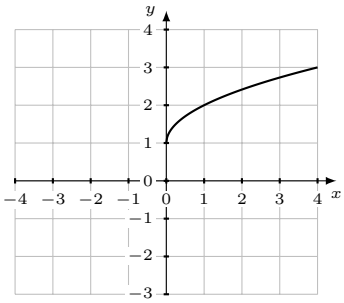
$f(x) = \sin(x) - 1$



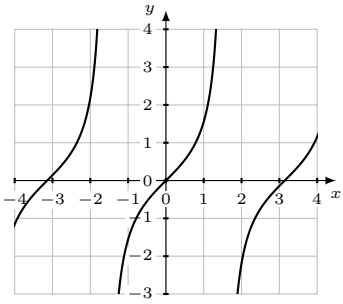
$f(x) = \sqrt{x}$



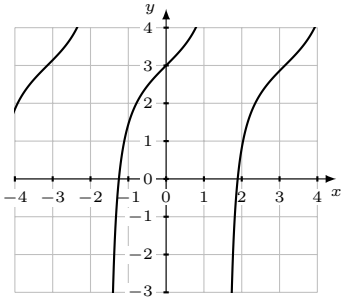
$f(x) = \sqrt{x} - 3$



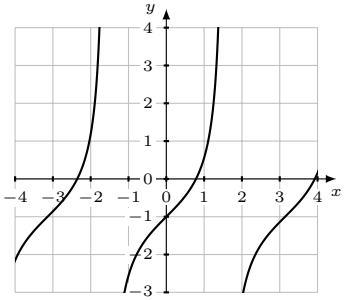
$f(x) = \sqrt{x} + 1$



$f(x) = \tan(x)$

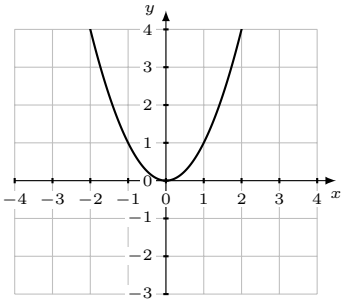


$f(x) = \tan(x) + 3$

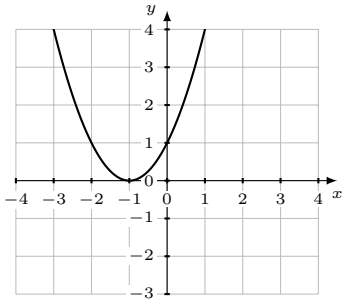


$f(x) = \tan(x) - 1$

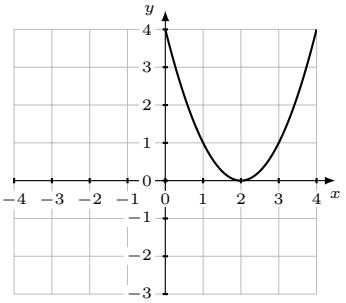
2. **Horizontale Verschiebungen.** Wird bei einer bestehenden Funktion zu jedem Vorkommen von x ein konstanter Wert addiert, so wird der Funktionsgraph um diesen Wert entlang der x-Achse nach **links** verschoben.



$f(x) = x^2$

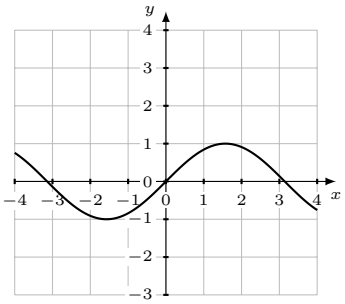


$f(x) = (x+1)^2$

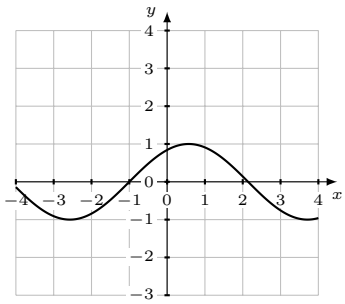


$f(x) = (x-2)^2$

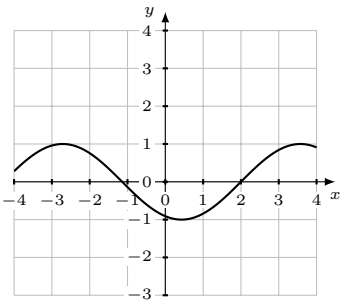
Geben Sie die Funktionsgleichung der verschobenen Funktionen an:



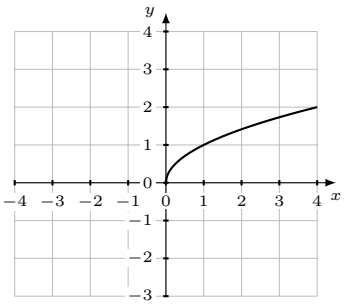
$f(x) = \sin(x)$



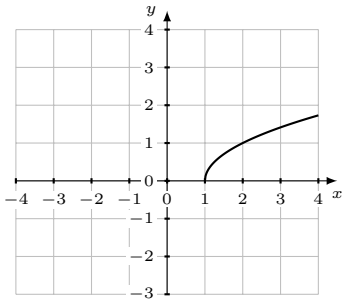
$f(x) = \sin(x+1)$



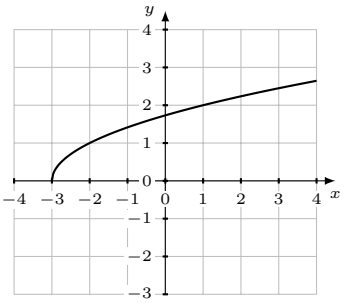
$f(x) = \sin(x-2)$



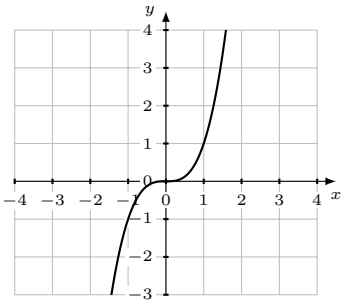
$f(x) = \sqrt{x}$



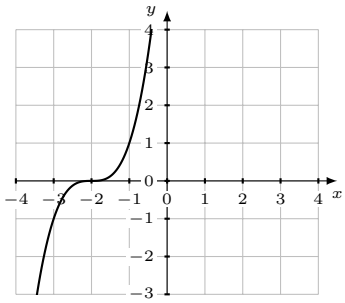
$f(x) = \sqrt{x-1}$



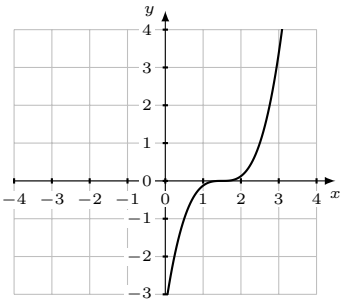
$f(x) = \sqrt{x+3}$



$f(x) = x^3$



$f(x) = (x+2)^3$

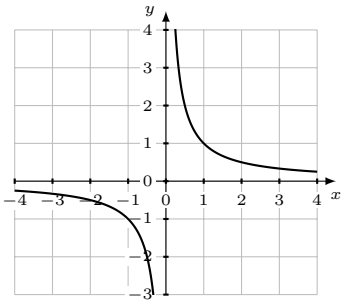


$f(x) = (x-1.5)^3$

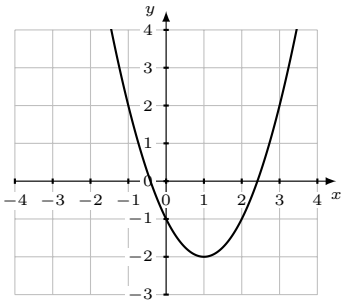
3. Allgemeine Verschiebungen. Geben Sie die Funktionsgleichung zu den dargestellten Funktionsgraphen an. Es werden folgende Grundfunktionen verwendet:

$$f(x) = x^2 \qquad f(x) = \cos(x) \qquad f(x) = \sqrt{x} = x^{\frac{1}{2}} \qquad f(x) = \frac{1}{x} = x^{-1}$$

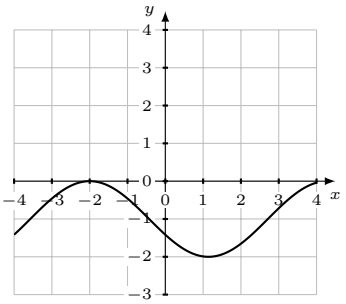
Geben Sie die Funktionsgleichung der verschobenen Funktionen an.



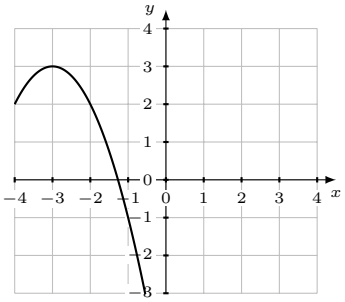
$f(x) = \frac{1}{x}$



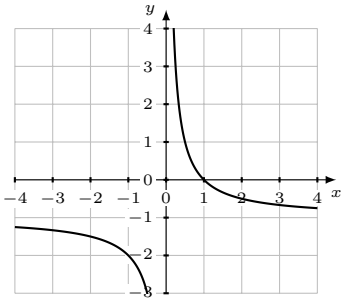
$f(x) = (x-1)^2 - 2$



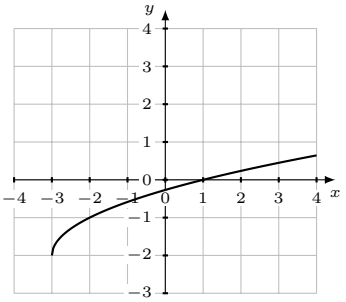
$f(x) = \cos(x+2) - 1$



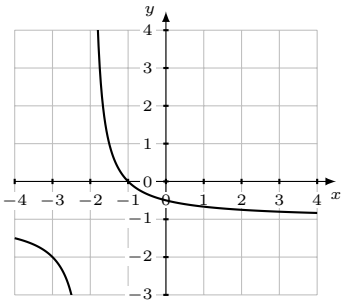
$f(x) = -(x+3)^2 + 3$



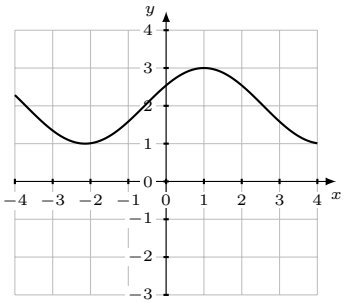
$f(x) = \frac{1}{x} - 1 = x^{-1} - 1$



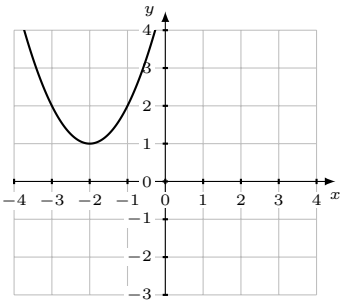
$f(x) = \sqrt{x+3} - 2$



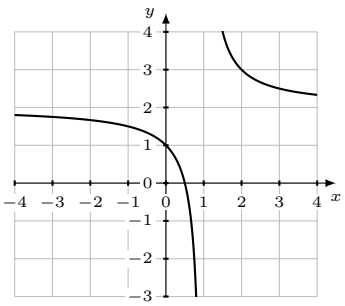
$f(x) = \frac{1}{x+2} - 1$



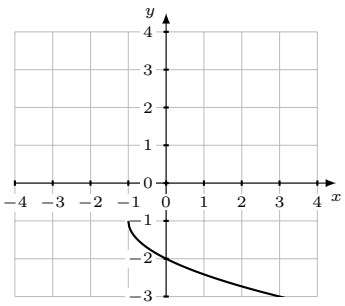
$f(x) = \cos(x-1) + 2$



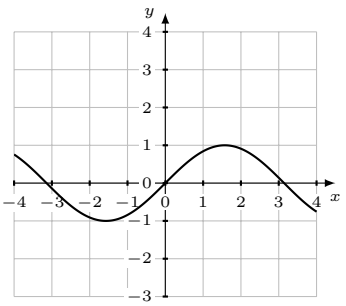
$f(x) = (x+2)^2 + 1$



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



$f(x) = -\sqrt{x+1} - 1$



$f(x) = \cos\left(x - \frac{\pi}{2}\right)$