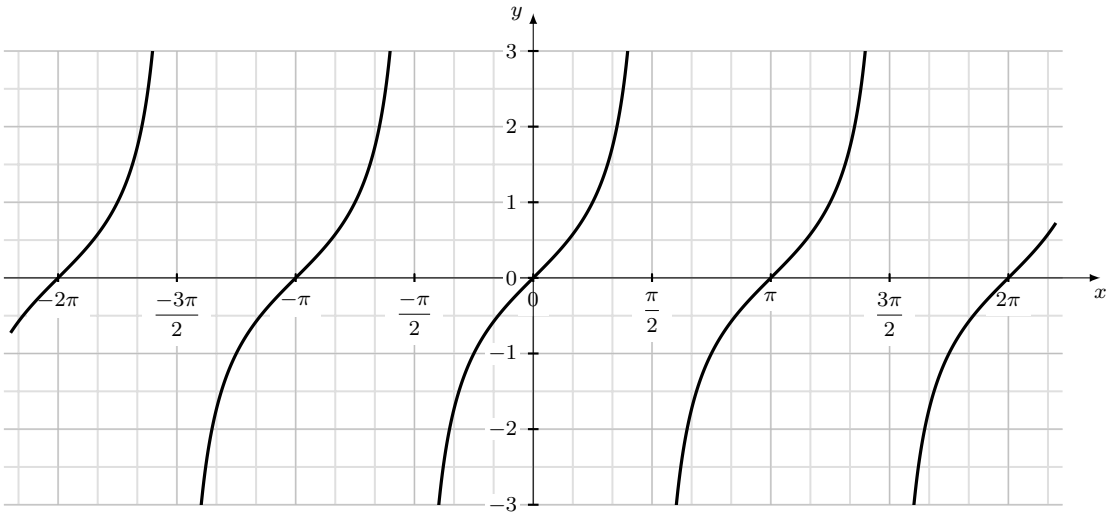
Vermischtes

1. **Eigenschaften Tangensfunktion.** Ergänzen Sie die Eigenschaften der Tangensfunktion

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



Definitionsmenge	**Alle reellen Zahlen ausgenommen $\frac{\pi}{2}$ und alle ganzzahligen Vielfache davo**
Wertemenge	**Alle reellen Zahlen** $W = \mathbb{R}$
Periodenlänge	$\pi \quad \Longrightarrow \quad \tan(x) = \tan(x + k \cdot \pi) \qquad k \in \mathbb{Z}$
Nullstellen	$\tan(k \cdot \pi) = 0 \qquad k \in \mathbb{Z}$
Symmetrie	**Punktsymmetrie bezüglich Ursprung** $\tan(x) = -\tan(-x)$

2. **Winkel.** Berechnen Sie auf vier Dezimalstellen genau. Winkel ohne Angabe einer Einheit oder mit der Angabe rad werden in Radiant (Bogenmass) gemessen. Winkel mit der Angabe ° werden in Grad gemessen.
   (a) $\sin(0.2) \approx 0.1987$
   (b) $\sin(15°) \approx 0.2588$
   (c) $\tan(3.141\,\text{rad}) \approx -0.0006$
   (d) $\tan(\pi) = 0$
   (e) $\tan(45°) = 1$
   (f) $\tan(30°) \approx 0.5774$
   (g) $1\,\text{rad}$ in Grad ≈ 57.2958
   (h) 5 in Grad ≈ 286.4789

(i) $80°$ in Radiant ≈ 1.3963

3. **Winkel gesucht.** Geben Sie den Winkel x in Grad und in Radiant (Bogenmass) auf vier Dezimalstellen genau an.

   (a) $\sin(x) = 1$ $x = \frac{\pi}{2} = 90° \approx 1.5708$

   (b) $\sin(x) = 0.5$ $x = 30° = \frac{\pi}{6} \approx 0.5236$

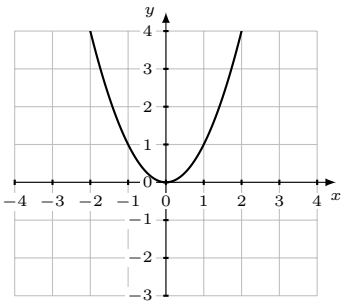
   (c) $\cos(x) = 0.3$ $x \approx 72.5424° \approx 1.2661$

   (d) $\cos(x) = 1.1$ **nicht definiert**

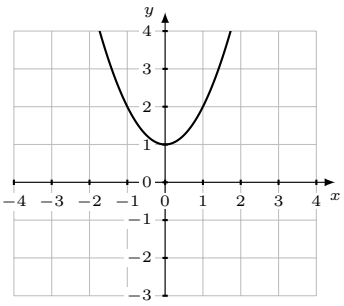
   (e) $\tan(x) = 0.3$ $x \approx 16.6992° \approx 0.2915$

   (f) $\tan(x) = 1.1$ $x \approx 47.7263° \approx 0.8330$

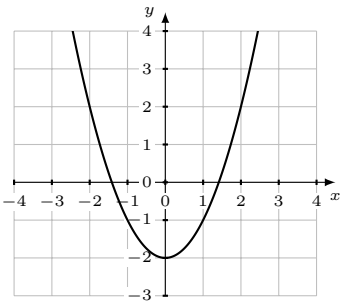
4. **Vertikale Verschiebungen.** Wird zu einer bestehenden Funktion ein konstanter Wert, d.h. eine fixe Zahl, addiert, so verschiebt sich der Funktionsgraph um diesen Wert entlang der y-Achse nach oben.



$f(x) = x^2$

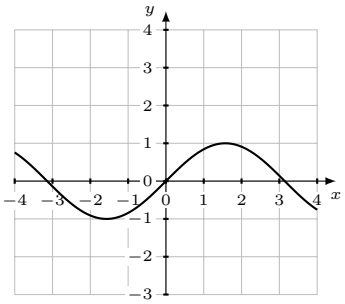


$f(x) = x^2 + 1$

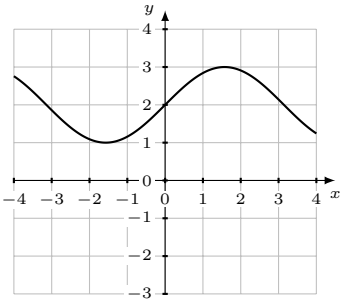


$f(x) = x^2 - 2$

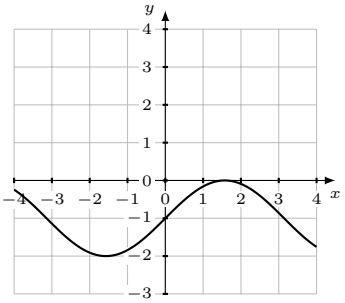
Geben Sie die Funktionsgleichung der verschobenen Funktionen an:



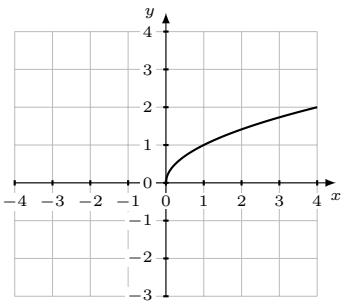
$f(x) = \sin(x)$



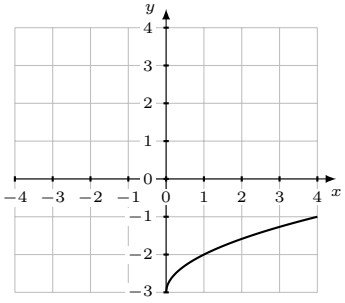
$f(x) = \sin(x) + 2$



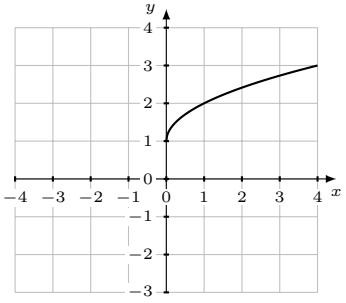
$f(x) = \sin(x) - 1$



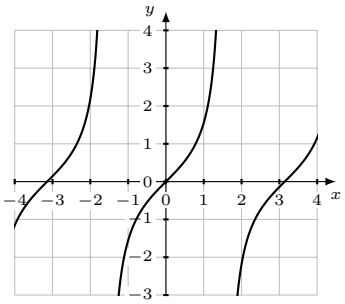
$f(x) = \sqrt{x}$



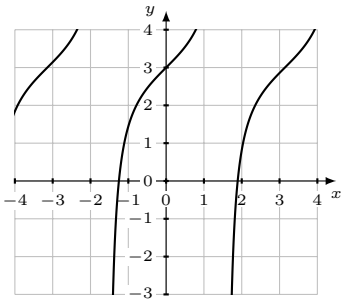
$f(x) = \sqrt{x} - 3$



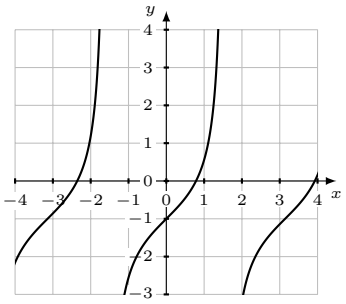
$f(x) = \sqrt{x} + 1$



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

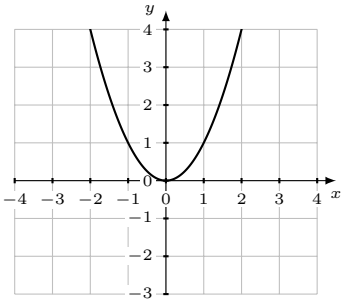


$f(x) = \tan(x) + 3$

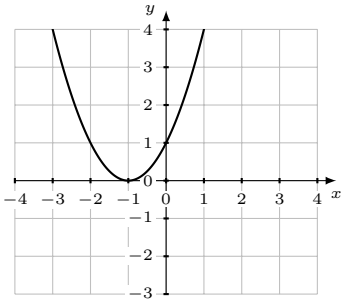


$f(x) = \tan(x) - 1$

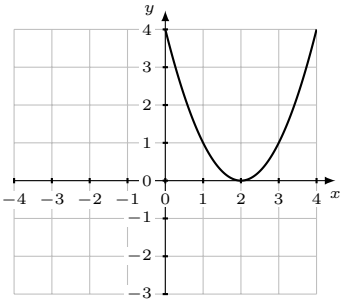
5. **Horizontale Verschiebungen.** Wird bei einer bestehenden Funktion zu jedem Vorkommen von x ein konstanter Wert addiert, so wird der Funktionsgraph um diesen Wert entlang der x-Achse nach **links** verschoben.



$f(x) = x^2$

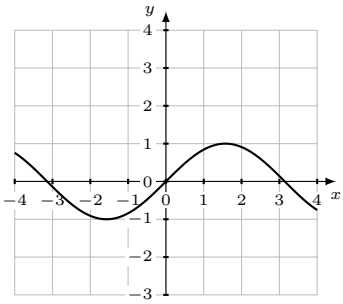


$f(x) = (x+1)^2$

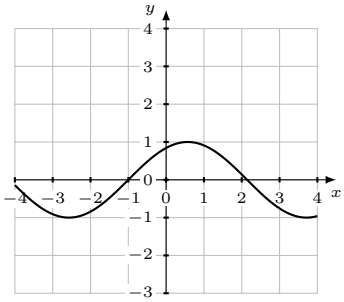


$f(x) = (x-2)^2$

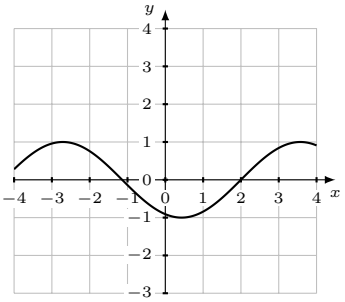
Geben Sie die Funktionsgleichung der verschobenen Funktionen an:



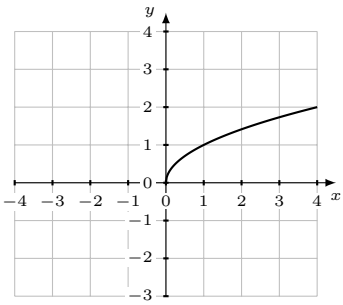
$f(x) = \sin(x)$



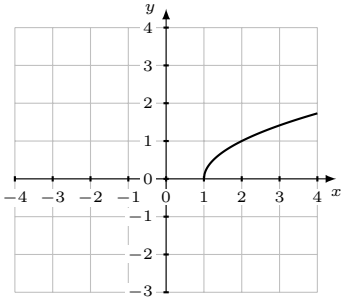
$f(x) = \sin(x+1)$



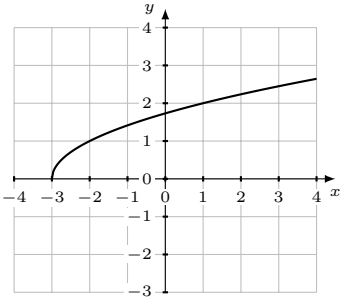
$f(x) = \sin(x-2)$



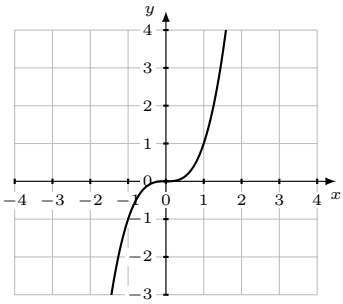
$f(x) = \sqrt{x}$



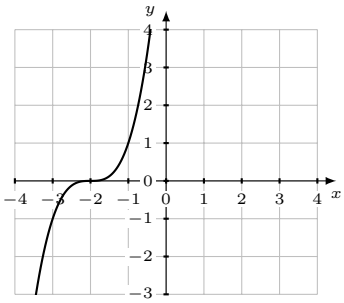
$f(x) = \sqrt{x-1}$



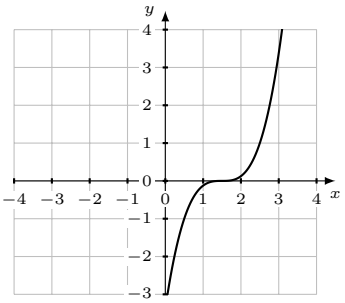
$f(x) = \sqrt{x+3}$



$f(x) = x^3$



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

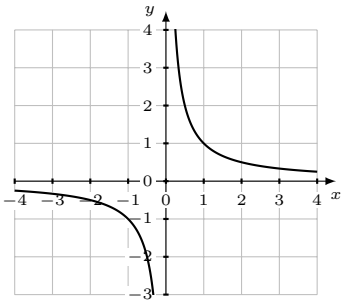


$f(x) = (x-1.5)^3$

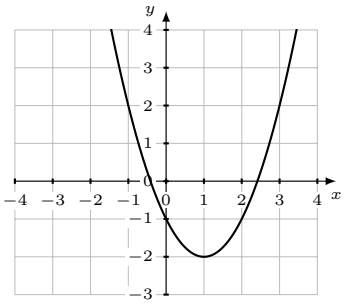
6. Allgemeine Verschiebungen. Geben Sie die Funktionsgleichung zu den dargestellten Funktionsgraphen an. Es werden folgende Grundfunktionen verwendet.

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

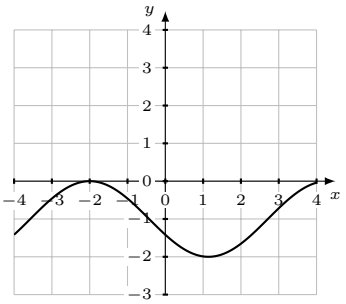
Geben Sie die Funktionsgleichung der verschobenen Funktionen an:



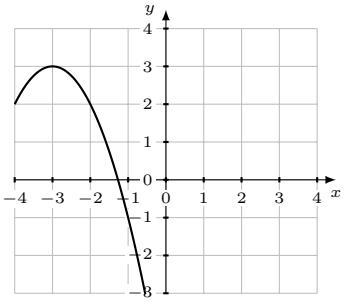
$f(x) = \frac{1}{x}$



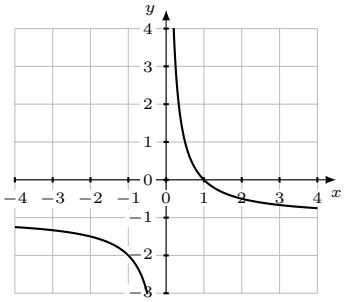
$f(x) = (x-1)^2 - 2$



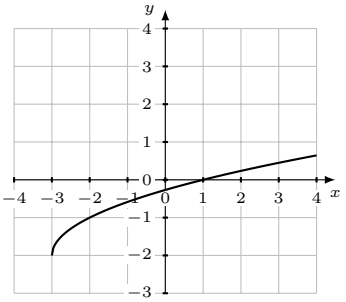
$f(x) = \cos(x+2) - 1$



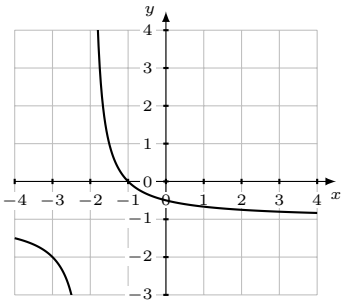
$f(x) = -(x+3)^2 + 3$



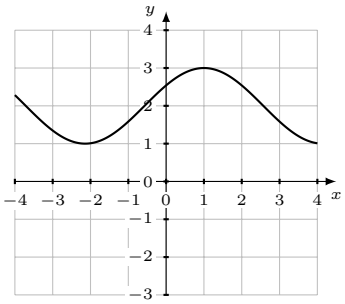
$f(x) = \frac{1}{x} - 1 = x^{-1} - 1$



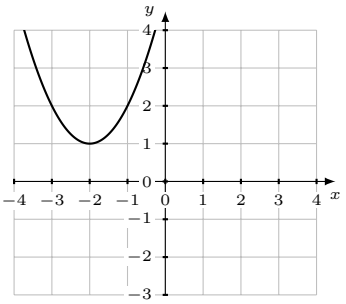
$f(x) = \sqrt{x+3} - 2$



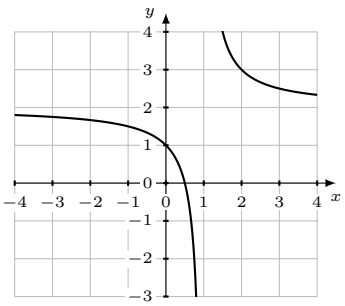
$f(x) = \frac{1}{x+2} - 1$



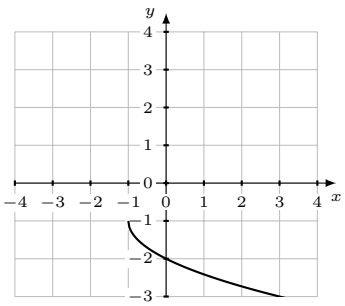
$f(x) = \cos(x-1) + 2$



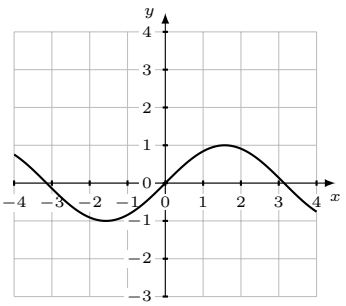
$f(x) = (x+2)^2 + 1$



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



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



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