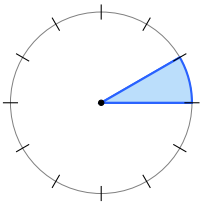
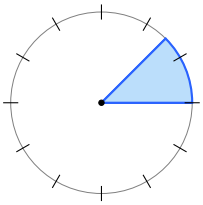
Sinus- und Kosinusfunktion

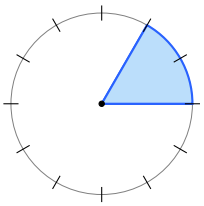
1. **Bogenmass.** Rechnen Sie den Winkel in die andere Einheit um und zeichnen Sie den Winkel im Kreis ein.



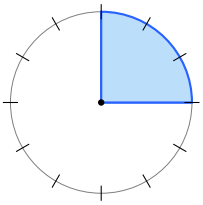
(a) $30° = \frac{\pi}{6}$ rad



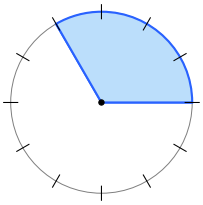
(b) $\frac{\pi}{4}$ rad $= 45°$



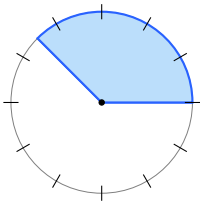
(c) $60° = \frac{\pi}{3}$ rad



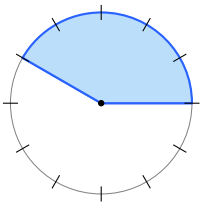
(d) $90° = \frac{\pi}{2}$ rad



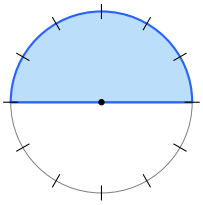
(e) $\frac{2\pi}{3}$ rad $= 120°$



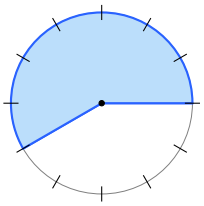
(f) $\frac{3\pi}{4}$ rad $= 135°$



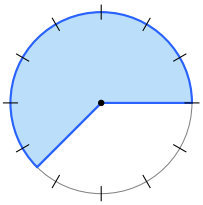
(g) $150° = \frac{5\pi}{6}$ rad



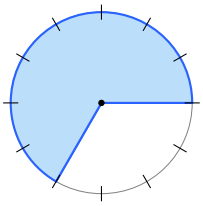
(h) π rad $= 180°$



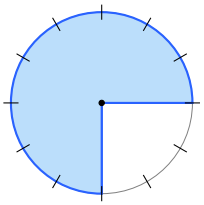
(i) $210° = \frac{7\pi}{6}$ rad



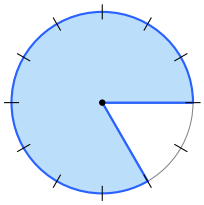
(j) $\frac{5\pi}{4}$ rad $= 225°$



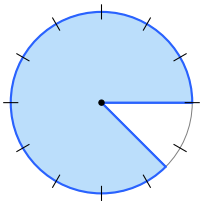
(k) $\frac{4\pi}{3}$ rad $= 240°$



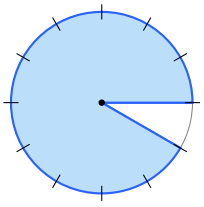
(l) $270° = \frac{3\pi}{2}$ rad



(m) $\frac{5\pi}{3}$ rad $= 300°$



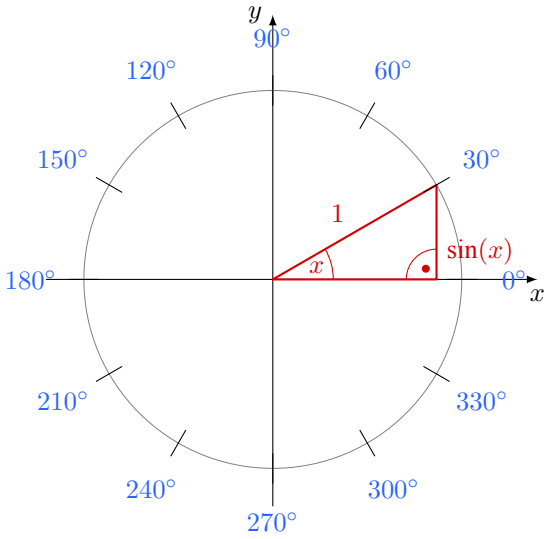
(n) $315° = \frac{7\pi}{4}$ rad

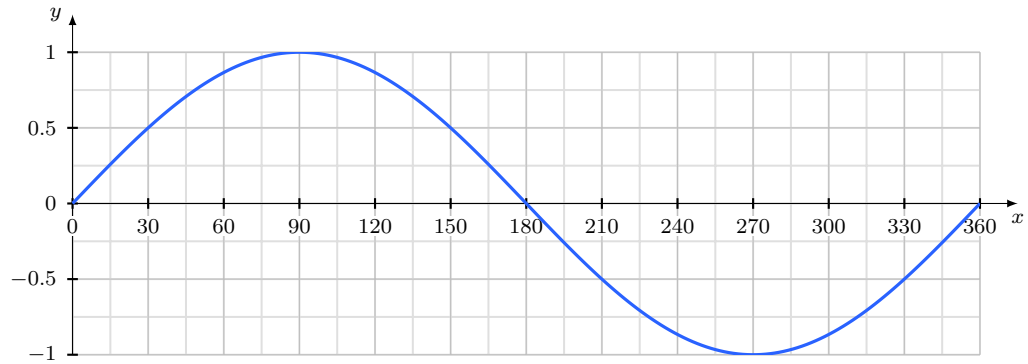


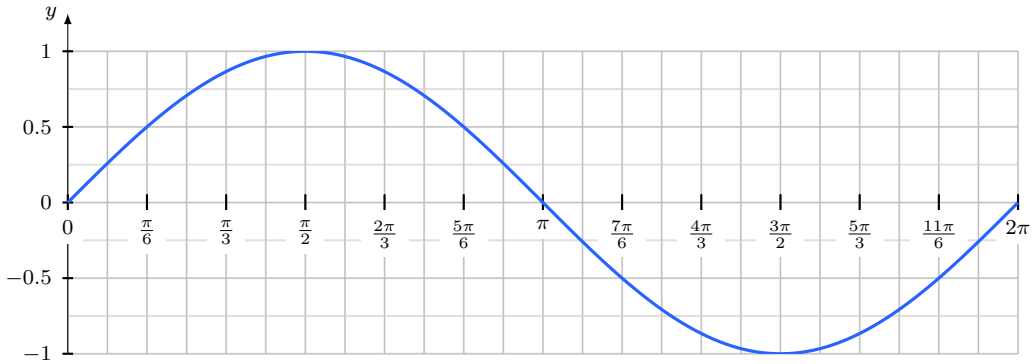
(o) $330° = \frac{11\pi}{6}$ rad

2. Sinusfunktion. Berechnen Sie die Werte der Sinusfunktion für die angegebenen Winkel. Nutzen Sie Symmetrien am Einheitskreis, um unnötige Berechnungen zu vermeiden. Zeichnen Sie anschliessend den Funktionsgraphen in den beiden Koordinatensystemen ein.

x [Grad]	x [Radiant]	$\sin(x)$
$0°$	0	0
$30°$	$\frac{\pi}{6} \approx 0.5236$	0.5
$60°$	$\frac{\pi}{3} \approx 1.0472$	0.8660
$90°$	$\frac{\pi}{2} \approx 1.5708$	1
$120°$	$\frac{2\pi}{3} \approx 2.0944$	0.8660
$150°$	$\frac{5\pi}{6} \approx 2.6180$	0.5
$180°$	$\pi \approx 3.1416$	0
$210°$	$\frac{7\pi}{6} \approx 3.6652$	-0.5
$240°$	$\frac{4\pi}{3} \approx 4.1888$	-0.8860
$270°$	$\frac{3\pi}{2} \approx 4.7124$	-1
$300°$	$\frac{5\pi}{3} \approx 5.2360$	-0.8660
$330°$	$\frac{11\pi}{6} \approx 5.7596$	-0.5
$360°$	$2\pi \approx 6.2832$	0

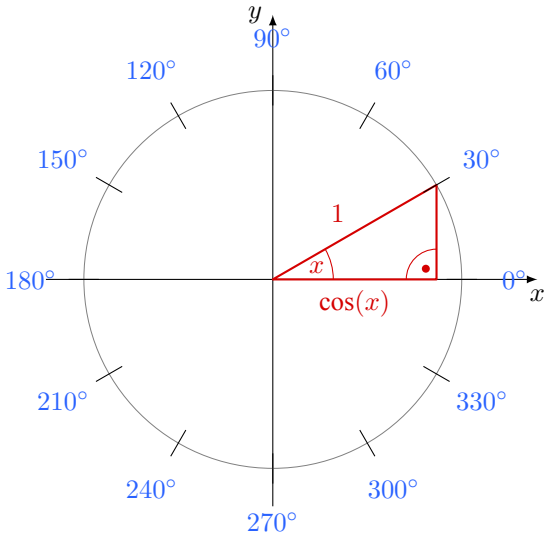


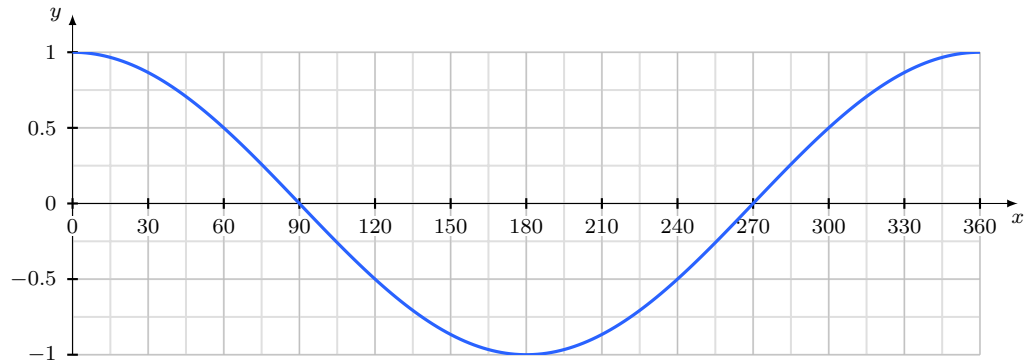


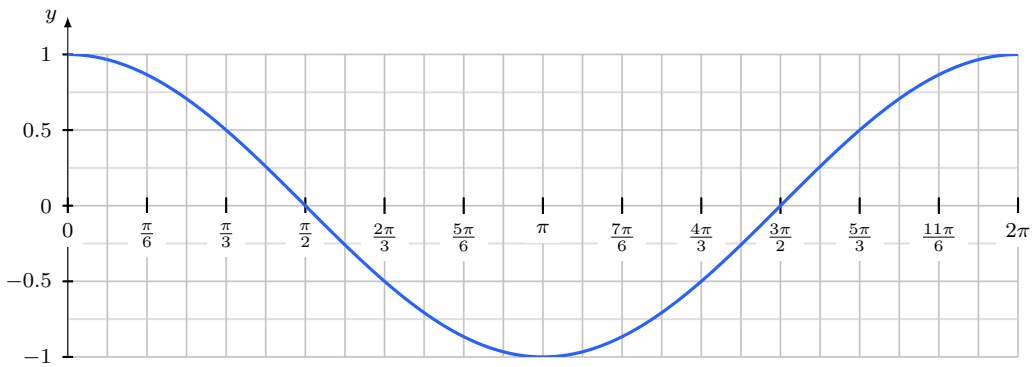


3. Kosinusfunktion. Berechnen Sie die Werte der Kosinusfunktion für die angegebenen Winkel. Nutzen Sie Symmetrien am Einheitskreis, um unnötige Berechnungen zu vermeiden. Zeichnen Sie anschliessend den Funktionsgraphen in den beiden Koordinatensystemen ein.

x [Grad]	x [Radiant]	$\sin(x)$
$0°$	0	1
$30°$	$\frac{\pi}{6} \approx 0.5236$	0.8660
$60°$	$\frac{\pi}{3} \approx 1.0472$	0.5
$90°$	$\frac{\pi}{2} \approx 1.5708$	0
$120°$	$\frac{2\pi}{3} \approx 2.0944$	-0.5
$150°$	$\frac{5\pi}{6} \approx 2.6180$	-0.8660
$180°$	$\pi \approx 3.1416$	-1
$210°$	$\frac{7\pi}{6} \approx 3.6652$	-0.8860
$240°$	$\frac{4\pi}{3} \approx 4.1888$	-0.5
$270°$	$\frac{3\pi}{2} \approx 4.7124$	0
$300°$	$\frac{5\pi}{3} \approx 5.2360$	0.5
$330°$	$\frac{11\pi}{6} \approx 5.7596$	0.8860
$360°$	$2\pi \approx 6.2832$	1

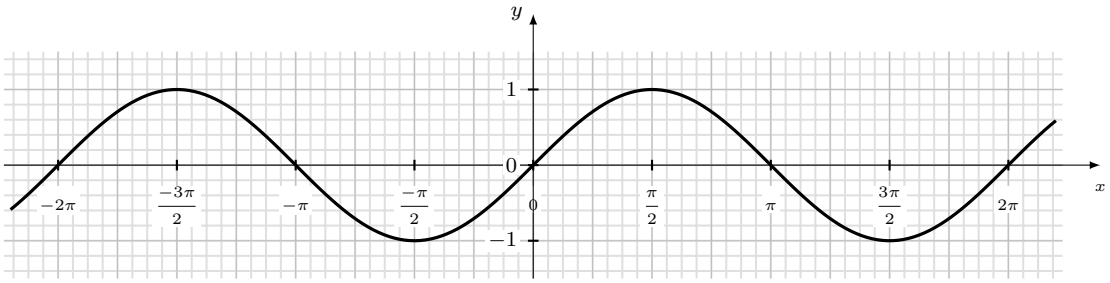






4. **Eigenschaften Sinusfunktion.** Geben Sie die Eigenschaften der Sinusfunktion an.

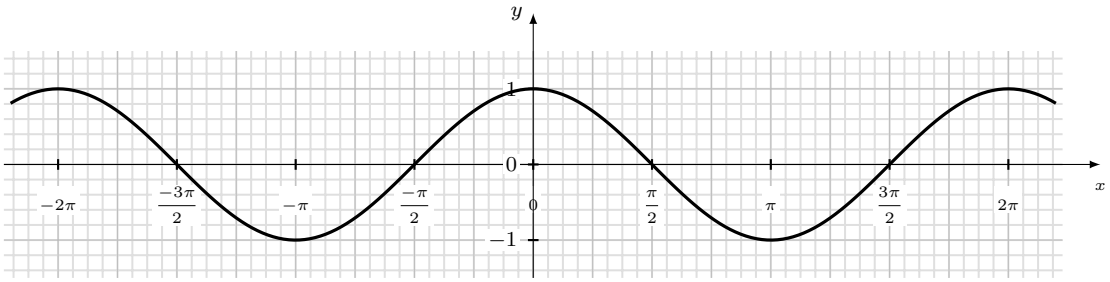
$f(x) = \sin(x)$



Definitionsmenge	$D = \mathbb{R}$
Wertemenge	$W = [-1, 1]$
Periodenlänge	$2\pi \quad \Longrightarrow \quad \sin(x) = \sin(x + k \cdot 2\pi) \qquad k \in \mathbb{Z}$
Nullstellen	$\sin(k \cdot \pi) = 0 \qquad k \in \mathbb{Z}$
Symmetrie	**Punktsymmetrie bezüglich Ursprung** $\sin(x) = -\sin(-x)$

5. **Eigenschaften Kosinusfunktion.** Geben Sie die Eigenschaften der Kosinusfunktion an.

$f(x) = \cos(x)$



Definitionsmenge	$D = \mathbb{R}$
Wertemenge	$W = [-1, 1]$
Periodenlänge	$2\pi \quad \Longrightarrow \quad \cos(x) = \cos(x + k \cdot 2\pi) \qquad k \in \mathbb{Z}$
Nullstellen	$\cos\left(\frac{\pi}{2} + k \cdot \pi\right) = 0 \qquad k \in \mathbb{Z}$
Symmetrie	**Achsensymmetrie bezüglich y-Achse** $\cos(x) = \cos(-x)$