

# Trigonometrische Beziehungen

## 1. Summensatz

$$\sin(\alpha \pm \beta) = \sin \alpha \cdot \cos \beta \pm \cos \alpha \cdot \sin \beta$$

$$\cos(\alpha \pm \beta) = \cos \alpha \cdot \cos \beta \mp \sin \alpha \cdot \sin \beta$$

$$\tan(\alpha \pm \beta) = \frac{\tan \alpha \cdot \tan \beta}{1 \mp \tan \alpha \cdot \tan \beta}$$

$$\sin(2\alpha) = 2 \cdot \sin \alpha \cdot \cos \alpha$$

$$\cos(2\alpha) = \cos^2 \alpha - \sin^2 \alpha$$

$$\tan(2\alpha) = \frac{2 \cdot \tan \alpha}{1 - \tan^2 \alpha}$$

## 2. Summensatz

$$\sin x + \sin y = 2 \cdot \sin \frac{x+y}{2} \cdot \cos \frac{x-y}{2}$$

$$\sin x - \sin y = 2 \cdot \cos \frac{x+y}{2} \cdot \sin \frac{x-y}{2}$$

$$\cos x + \cos y = 2 \cdot \cos \frac{x+y}{2} \cdot \cos \frac{x-y}{2}$$

$$\cos x - \cos y = -2 \cdot \sin \frac{x+y}{2} \cdot \sin \frac{x-y}{2}$$

## Trigonometrischer Pythagoras

$$\sin^2 x + \cos^2 x = 1$$

$$\sin^2 x = 1 - \cos^2 x \quad \sin x = \sqrt{1 - \cos^2 x}$$

$$\cos^2 x = 1 - \sin^2 x \quad \cos x = \sqrt{1 - \sin^2 x}$$

## Sonstige Beziehungen

$$\sin^2 x = \frac{1}{2}[1 - \cos(2x)]$$

$$\cos^2 x = \frac{1}{2}[1 + \cos(2x)]$$

$$\sin \frac{\alpha}{2} = \sqrt{\frac{1-\cos \alpha}{2}}$$

$$\cos \frac{\alpha}{2} = \sqrt{\frac{1+\cos \alpha}{2}}$$

$$\tan \frac{\alpha}{2} = \sqrt{\frac{1-\cos \alpha}{1+\cos \alpha}}$$

## Merkstruktur

|    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|
| SI | CO | CO | SI | CO | CO | SI | SI |
|----|----|----|----|----|----|----|----|