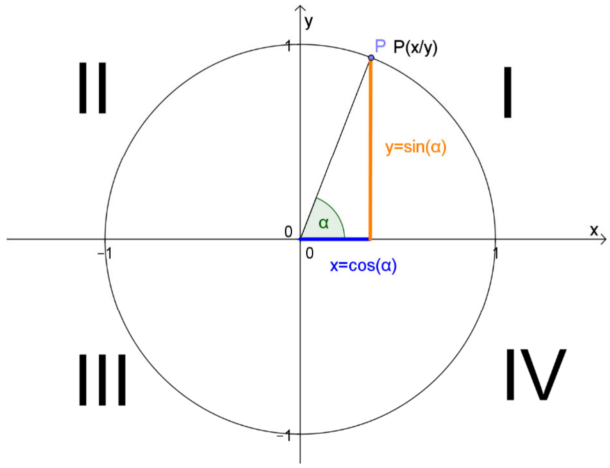
Sinus und Kosinus am Einheitskreis – Lösung

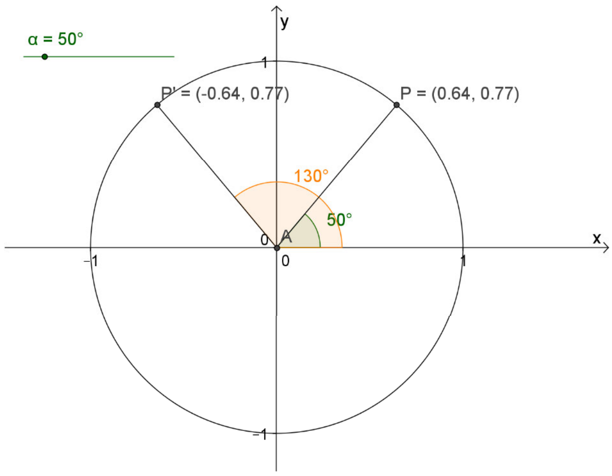
1. Für die Koordinaten eines Punktes P auf dem Einheitskreis gilt:

$P(x\ /\ y)$ x-Koordinate: $\cos(\alpha)$
y-Koordinate: $\sin(\alpha)$

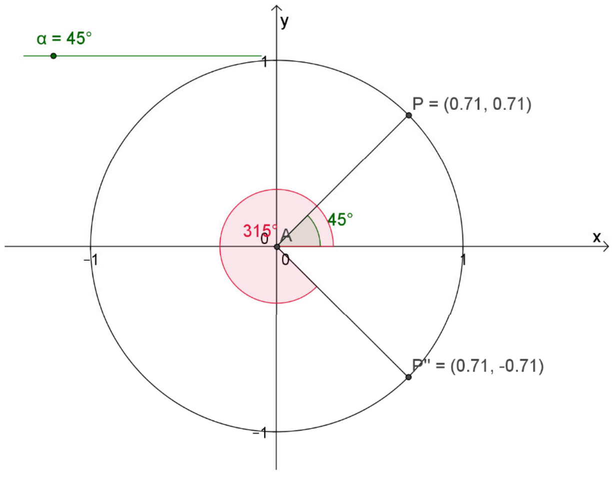


a) $\cos(100°) \approx -0{,}174 \quad \sin(100°) \approx 0{,}985 \quad \Longrightarrow \quad A(-0{,}174\ /\ 0{,}985) \quad \Longrightarrow 2.\,Quadrand$
b) $\cos(37°) \approx 0{,}799 \quad \sin(37°) \approx 0{,}602 \quad \Longrightarrow \quad A(0{,}799\ /\ 0{,}602) \quad \Longrightarrow 1.\,Quadrand$
c) $\cos(180°) = -1 \quad \sin(180°) = 0 \quad \Longrightarrow \quad A(-1/\ 0) \quad \Longrightarrow x - Achse\ zwischen\ 2.\,und\ 3.\,Quadranden$
d) $\cos(250°) \approx -0{,}342 \quad \sin(250°) \approx -0{,}940 \quad \Longrightarrow \quad A(0{,}342\ /\ -0{,}940) \quad \Longrightarrow 4.\,Quadrand$
e) $\cos(300°) = 0{,}5 \quad \sin(300°) = -\frac{\sqrt{3}}{2} \quad \Longrightarrow \quad A(0{,}5\ /\ -\frac{\sqrt{3}}{2}) \quad \Longrightarrow 4.\,Quadrand$
f) $\cos(380°) \approx 0{,}940 \quad \sin(380°) \approx 0{,}342 \quad \Longrightarrow \quad A(0{,}940\ /\ 0{,}342) \quad \Longrightarrow 1.\,Quadrand$

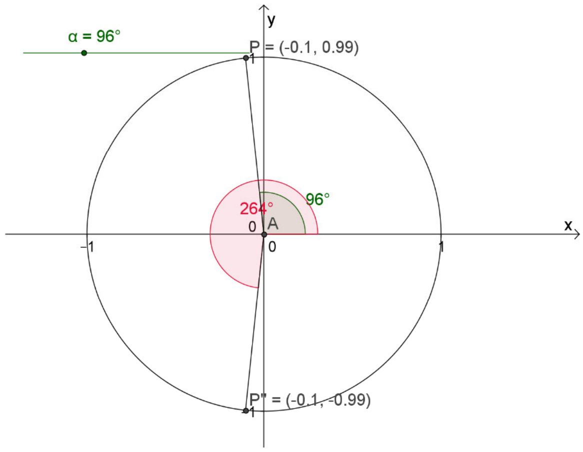
2.
a) $\sin\alpha = 0{,}7660 \quad \Longrightarrow \alpha_1 = \sin^{-1} 0{,}7660 \approx 50° \quad \Longrightarrow \alpha_2 = 180° - 50° = 130°$



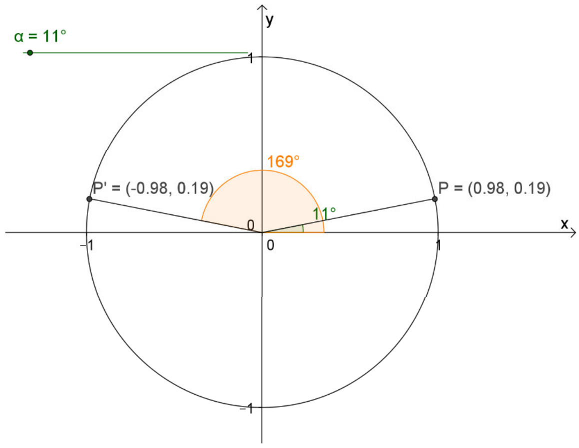
b) $\cos\alpha = 0{,}7071 \quad \Longrightarrow \alpha_1 = \cos^{-1} 0{,}7071 \approx 45° \quad \Longrightarrow \alpha_2 \approx 360° - 45° = 315°$



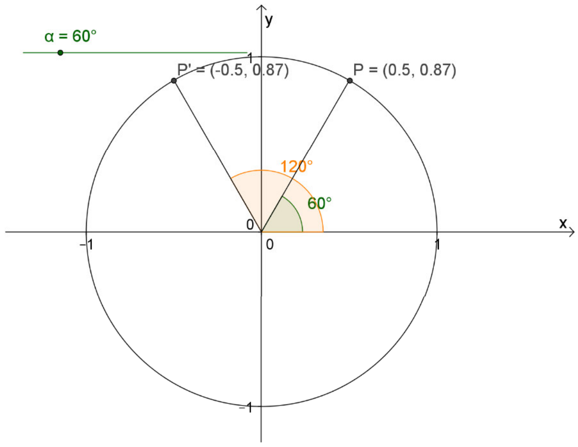
c) $\cos\alpha = -0{,}1045 \quad \Longrightarrow \alpha_1 = \cos^{-1} -0{,}1045 \approx 96° \quad \Longrightarrow \alpha_2 \approx 360° - 96° = 264°$



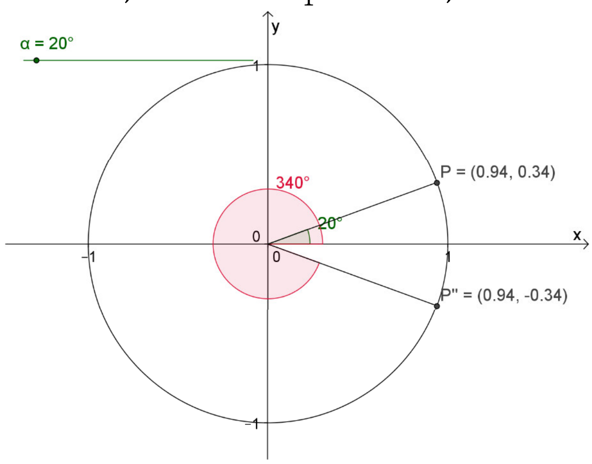
d) $\sin\alpha = -0{,}1908 \quad \Longrightarrow \alpha_1 = \sin^{-1} -0{,}1908 \approx 11° \quad \Longrightarrow \alpha_2 = 180° - 11° = 169°$



e) $\sin\alpha = 0{,}8660 \quad \Longrightarrow \alpha_1 = \sin^{-1} 0{,}8660 \approx 60° \quad \Longrightarrow \alpha_2 = 180° - 60° = 120°$



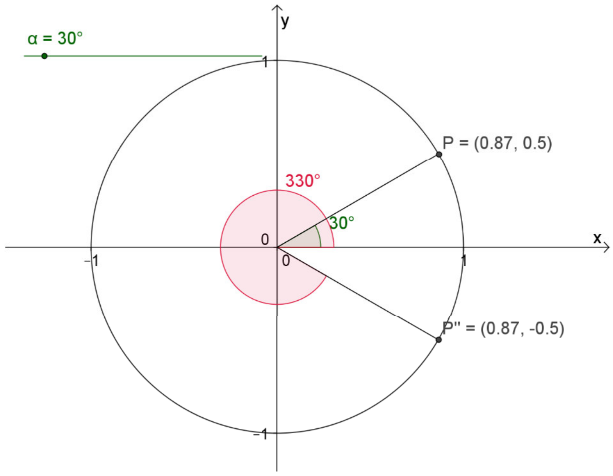
f) $\cos\alpha = 0{,}9397 \quad \Longrightarrow \alpha_1 = \cos^{-1} 0{,}9397 \approx 20° \quad \Longrightarrow \alpha_2 \approx 360° - 20° = 340°$



3.

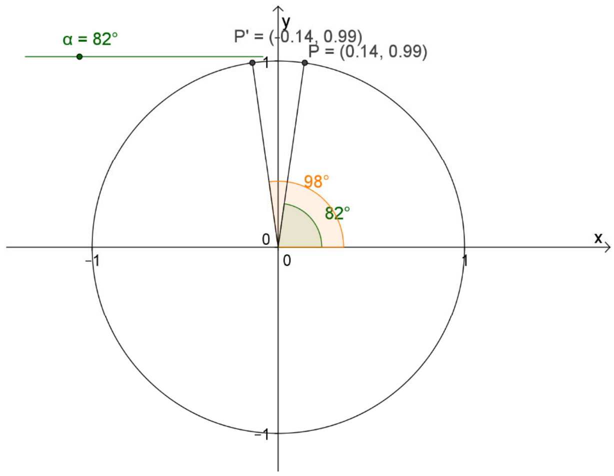
a) $\alpha_1 = \cos^{-1}\frac{\sqrt{3}}{2} = 30°$ $\quad \alpha_2 \approx 360° - 30° = 330°$

$y_1 = \sin(30°) = 0{,}5 \quad y_2 = \sin(330°) = -0{,}5$



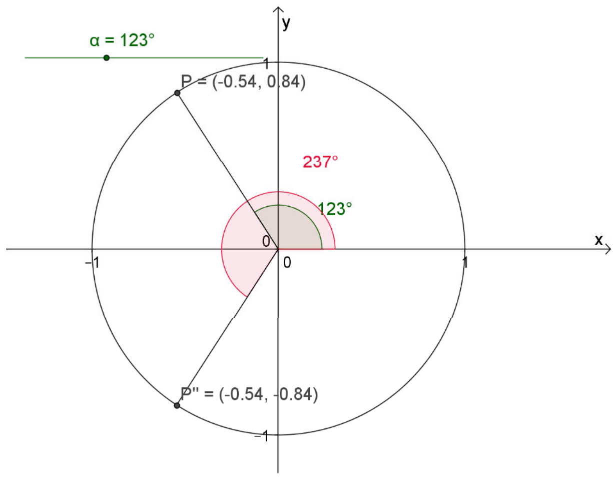
b) $\alpha_1 = \sin^{-1} 0{,}990 = 82°$ $\quad \alpha_2 \approx 180° - 82° = 98°$

$x_1 = \cos(82°) = 0{,}14 \quad y_2 = \cos(98°) = -0{,}14$



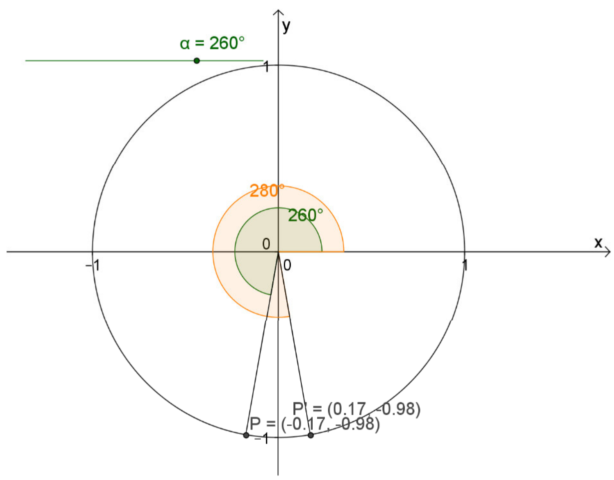
c) $\alpha_1 = \cos^{-1} -0{,}545 = 123°$ $\quad \alpha_2 \approx 360° - 123° = 237°$

$y_1 = \sin(123°) = 0{,}84 \quad y_2 = \sin(237°) = -0{,}84$



d) $\alpha_1 = \sin^{-1} -0{,}985 = 280°$ $\quad \alpha_2 \approx 180° + 80° = 260°$

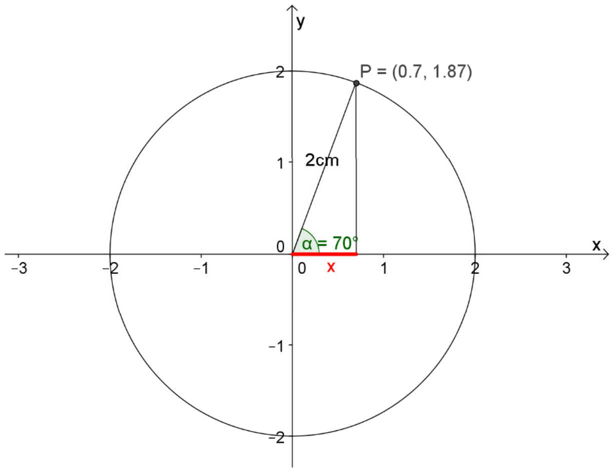
$x_1 = \cos(280°) = 0{,}17 \quad y_2 = \cos(260°) = -0{,}17$



5.

a) $\cos(\alpha) = \frac{x}{2}$ $\quad x = 2 \cdot \cos(\alpha) = 0{,}684$

$\sin(\alpha) = \frac{y}{2}$ $\quad x = 2 \cdot \sin(\alpha) = 1{,}879$

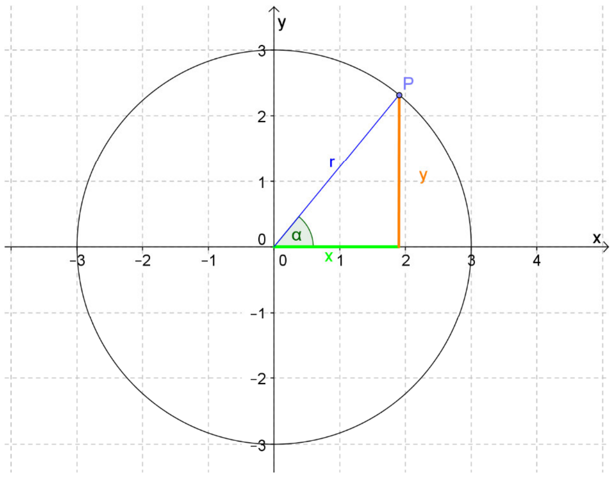


b) $\cos(\alpha) = \frac{x}{5}$ $\quad x = 5 \cdot \cos(\alpha) = -4{,}70$

$\sin(\alpha) = \frac{y}{2}$ $\quad x = 5 \cdot \sin(\alpha) = -1{,}71$

c) $\sin(\alpha) = \frac{y}{r}$ $\quad \alpha = \sin^{-1}\frac{y}{r} = 50°$

$x = r \cdot \cos(\alpha) = 3 \cdot \cos(50°) = 1{,}93$



d) $\cos(\alpha) = \frac{x}{r}$ $\quad \alpha = cos^{-1}\frac{x}{r} = 0°$

$x = r \cdot \sin(\alpha) = 0{,}5 \cdot \sin(0°) = 0{,}5$