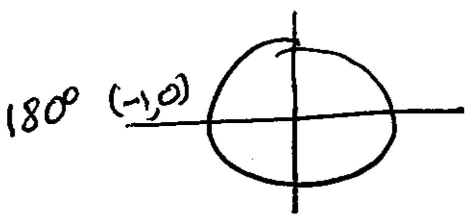
§6.6 Practice

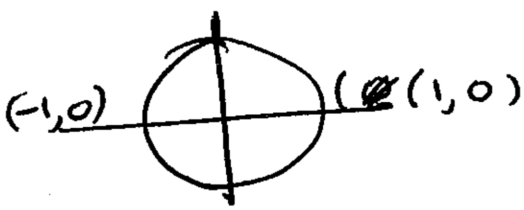
Find all angles in degrees that satisfy each equation. Round approximate answers to the nearest tenth degree.

① $\cos\alpha = -1$



$\alpha = 180° + 2k\pi$

② $\tan\alpha = 0$



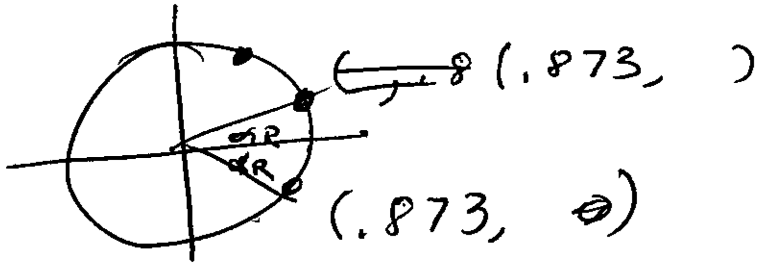
$\cancel{\alpha = 0 + k\pi}$

$\cancel{\alpha = k\pi}$

$\boxed{\alpha = 180°k}$

③ $\cos\alpha = 0.873$

$\alpha_R = \cos^{-1}(0.873) \approx 29.2°$



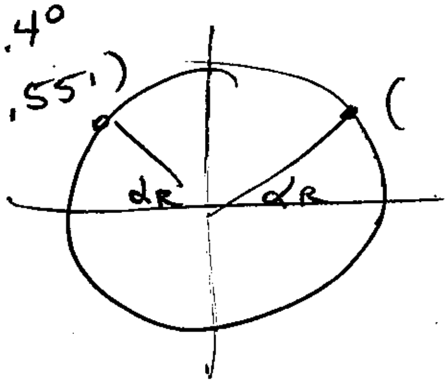
$\{29.2° + 360°k,\ -29.2° + 360°k\}$

(4) $\sin\alpha = 0.551$

$\alpha_R = \sin^{-1}(.551) \approx 33.4°$

$180° - 33.4°$
$= 146.6°$ $(\ , .551)$

$(\ , .551)$



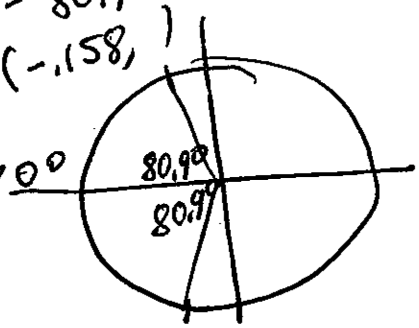
$\{33.4° + 360°k,\ 146.6° + 360°k\}$

(5) $\cos\alpha = -0.158$

$\alpha_R = \cos^{-1}(.158) \approx 80.9°$

$180° - 80.9°$
$(-.158, \ )$

$180°$

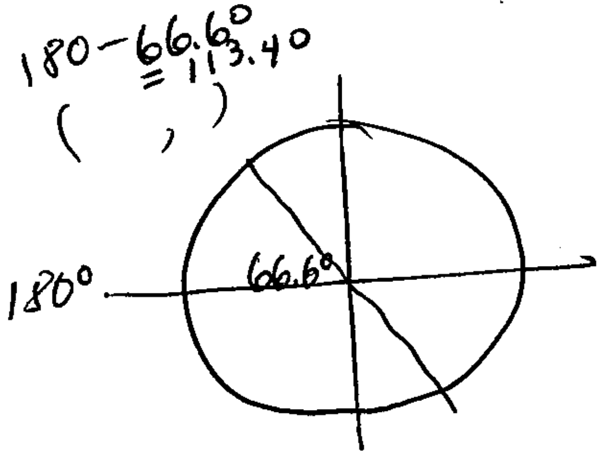


$\{99.1 + 360°k,\ 260.9° + 360°k\}$

$(-.158, \ )$
$180° + 80.9°$

⑥ $\tan \alpha = -2.31$

$$\alpha_R = \tan^{-1}(2.31) \approx 66.6^\circ$$



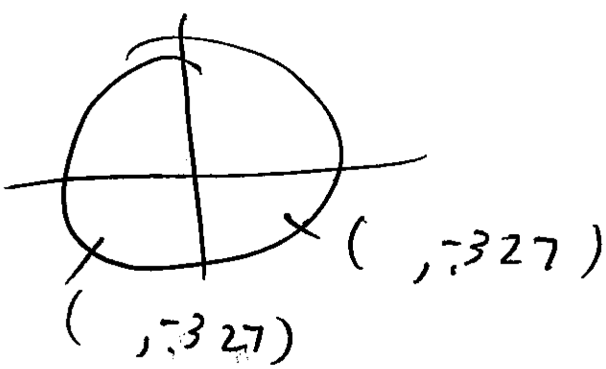
$$\{113.4^\circ + 180^\circ k\}$$

⑦ $\sin \alpha = -0.327$

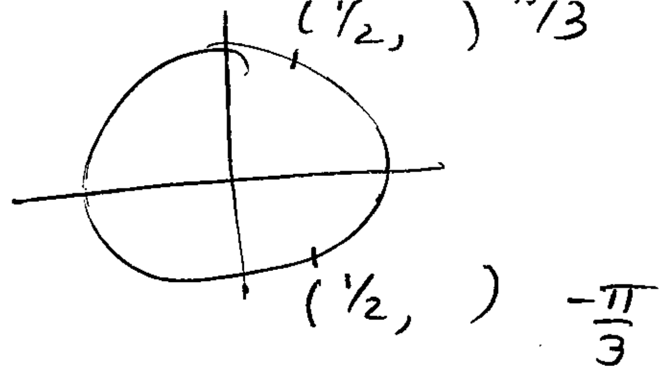
$$\alpha_R = \sin^{-1}(.327) \approx 19.1^\circ$$

$$\alpha_1 = -19.1^\circ, \quad \alpha_2 = 180 - 19.1^\circ = 199.1^\circ$$

$$\{-19.1^\circ + 360^\circ k, \quad 199.1^\circ + 360^\circ k\}$$



Find all real numbers that satisfy the equation.



(8) $\cos\left(\frac{x}{2}\right) = \frac{1}{2}$

$\frac{x}{2} = \frac{\pi}{3} + 2k\pi$

$\boxed{x = \frac{2}{3}\pi + 4k\pi}$

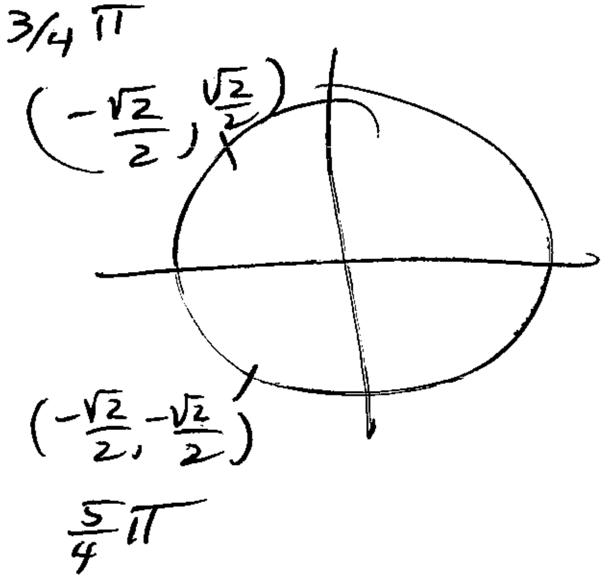
$\frac{x}{2} = -\frac{\pi}{3} + 2k\pi$

$\boxed{x = -\frac{2}{3}\pi + 4k\pi}$

$\left\{\pm\frac{2}{3}\pi + 4k\pi\right\}$

9) $2\cos 2x = -\sqrt{2}$

$\cos 2x = -\frac{\sqrt{2}}{2}$



$2x = \frac{3}{4}\pi + 2k\pi$

$\boxed{x = \frac{3}{8}\pi + k\pi}$

$2x = \frac{5}{4}\pi + 2k\pi$

$\boxed{x = \frac{5}{8}\pi + k\pi}$

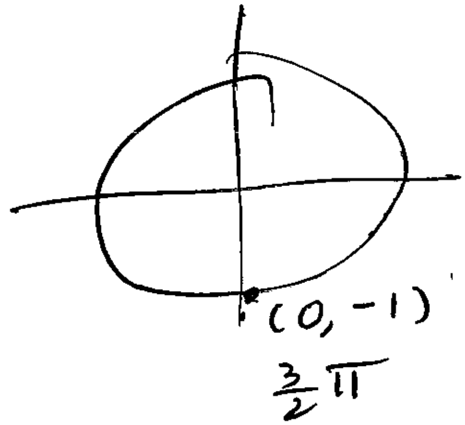
$\{ \frac{3}{8}\pi + k\pi, \frac{5}{8}\pi + k\pi$

(10) $\sin\left(\frac{x}{3}\right) + 1 = 0$

$\sin\left(\frac{x}{3}\right) = -1$

$\frac{x}{3} = \frac{3}{2}\pi + 2k\pi$

$\boxed{x = \frac{9}{2}\pi + 6k\pi}$

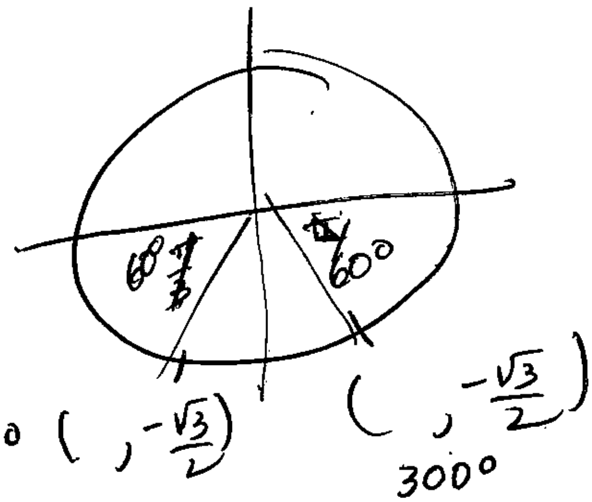


(11) Find all values α in $[0°, 360°)$ that satisfy the equation

(11) $2\sin\alpha = -\sqrt{3}$

$\sin\alpha = -\frac{\sqrt{3}}{2}$

$\{240°, 300°\}$



(12) $16\sin^2\alpha - 8\sin\alpha - 1 = 0$

Let $u = \sin\alpha$

$$16u^2 - 8u - 1 = 0$$

$$u = \frac{8 \pm \sqrt{(-8)^2 - 4(16)(-1)}}{2(16)}$$

$$= \frac{8 \pm \sqrt{64+64}}{32} = \frac{8 \pm \sqrt{2 \cdot 64}}{32}$$

$$= \frac{8 \pm 8\sqrt{2}}{8 \cdot 4} = \frac{1 \pm \sqrt{2}}{4}$$

$$u_1 = \frac{1+\sqrt{2}}{4} \approx 0.60355339 1$$

$$u_2 = \frac{1-\sqrt{2}}{4} \approx -.10355339 1$$

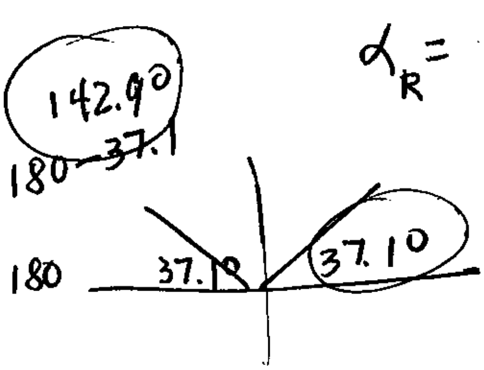
$\sin\alpha = .603553391$

$\alpha_R = 37.1^\circ$

$\sin\alpha = \dfrac{1-\sqrt{2}}{4} \approx -.10355$

$\alpha_R = \sin^{-1}(.1035533$

$\approx \cancel{5.94}^\circ$ 5.9°



$\{37.1^\circ, 142.9^\circ, 185.9^\circ, 354.1^\circ\}$