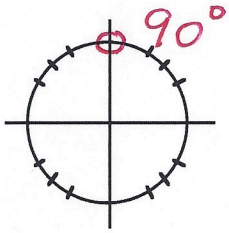
7. Find *all* degree solutions for θ.

To find all degree (or radian) solutions, first find the solutions for "arg" in one revolution around the unit circle and then add $360°k$ (or $2\pi k$).



$\csc(3\theta) - 1 = 0$

(ii) $\csc(\text{arg}) - 1 = 0$

(i) there is no solving interval, so we skip this part.

$\csc(\text{arg}) = 1$

$\text{arg} = 90° + 360°k$

$3\theta = 90° + 360°k$

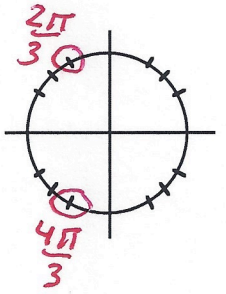
$\frac{}{3} \quad \frac{}{3} \quad \frac{}{3}$

(iii) Adjust the solution set by dividing each side by 3.

$\theta = 30° + 120°k, \; k \in \mathbb{Z}$

8. Find *all* radian solutions for x.

(i) No solving interval; skip this step.



$2\cos(4x) + 1 = 0$

(ii) $2\cos(\text{arg}) + 1 = 0$

$2\cos(\text{arg}) = -1$

$\cos(\text{arg}) = -\frac{1}{2}$

QII: $\text{arg} = \frac{2\pi}{3} + 2\pi k$ → $4x = \frac{2\pi}{3} + 2\pi k$

QIII: $\text{arg} = \frac{4\pi}{3} + 2\pi k$ → $4x = \frac{4\pi}{3} + 2\pi k$

(iii) Adjust the solution set by dividing by 4 or multiplying by $\frac{1}{4}$

$\frac{4x}{4} = \frac{1}{4} \cdot \frac{2\pi}{3} + \frac{2\pi k}{4}$ $\qquad$ $\frac{4x}{4} = \frac{1}{4} \cdot \frac{4\pi}{3} + \frac{2\pi k}{4}$

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

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

$k \in \mathbb{Z}$

Sec. 6.1 Altered Arguments

9. Solve the equation for $0° \le \theta < 360°$.

i) Adjust the solving interval to fit the argument.
ii) Let arg = the argument and solve using the altered interval.
iii) Adjust the solution set by solving for θ or x.

$\tan(\theta + 80°) = \sqrt{3}$

(ii) $\tan(\text{arg}) = \sqrt{3}$

$\text{arg} = 240°, 420°$

$\theta + 80° = 240°, 420°$

(iii) $-80° \quad -80° \quad -80°$

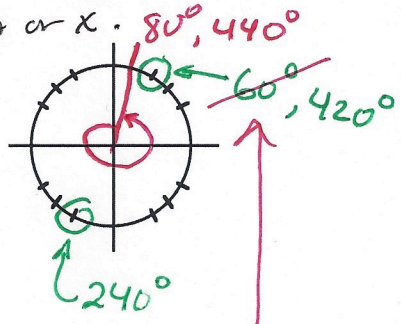
$\theta = 160°, 340°$

(i) $0° \le \theta < 360°$

$+80° \quad +80° \quad +80°$

$80° \le \theta + 80° < 440°$

(iii) Adjust the solution set by adding $-80°$ to each side.



We can't use $60°$ as a solution for arg because it is not in the altered solving interval.

10. Solve the equation for $0 \le x < 2\pi$.

$\sec\left(x - \frac{\pi}{3}\right) = \sqrt{2}$

$\sec(\text{arg}) = \sqrt{2}$

$\text{arg} = -\frac{\pi}{4}, \frac{\pi}{4}$

$x - \frac{\pi}{3} = -\frac{\pi}{4}, \frac{\pi}{4}$

$+\frac{\pi}{3} \quad +\frac{\pi}{3} \quad +\frac{\pi}{3}$

$x = \frac{\pi}{12}, \frac{7\pi}{12}$

(i) $0 \le x < 2\pi$

$-\frac{\pi}{3} \quad -\frac{\pi}{3} \quad -\frac{\pi}{3}$

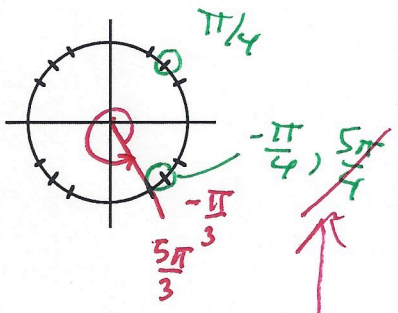
$-\frac{\pi}{3} \le x - \frac{\pi}{3} < \frac{5\pi}{3}$

$-\frac{\pi}{3} \le \text{arg} < \frac{5\pi}{3}$

(iii) Adjust the solution set by adding $\frac{\pi}{3}$

$-\frac{\pi}{4} + \frac{\pi}{3} = -\frac{3\pi}{12} + \frac{4\pi}{12} = \frac{\pi}{12}$

$\frac{\pi}{4} + \frac{\pi}{3} = \frac{3\pi}{12} + \frac{4\pi}{12} = \frac{7\pi}{12}$



We can't use $\frac{5\pi}{4}$ as a solution for arg because it is not in the altered solving interval.