Honors Pre-Calculus

Name KEY

Solving Sin & Cos Equations - Practice

Date _____ Period ____

Solve each equation for $0 \le \theta < 360$.

1) $-1 + \cos\theta = \dfrac{-2-\sqrt{2}}{2}$ → PER = 360°

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

$\theta = \cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)$

#1: $\theta = 135°$

#2: PER − #1 = 360 − 135 = 225°

2) $5 + \cos\theta = \dfrac{10+\sqrt{2}}{2}$ → PER = 360°

$\cos\theta = \frac{\sqrt{2}}{2}$

$\theta = \cos^{-1}\left(\frac{\sqrt{2}}{2}\right)$

#1: $\theta = 45°$

#2: PER − #1 = 360 − 45 = 315°

3) $2\cos\theta = -\sqrt{2}$ → PER = 360°

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

#1: $\theta = 135°$

#2: 360 − 135 = 225°

4) $-1 = -2\cos\theta$ → PER = 360°

$\frac{1}{2} = \cos\theta$

#1: $60° = \theta$

#2: 360 − 60° = 300°

5) $5 + \sin\theta = \dfrac{9}{2}$ → PER = 360°

$\sin\theta = -\frac{1}{2}$

$\theta = \sin^{-1}\left(-\frac{1}{2}\right)$

#1: $\theta = -30$ + PER = 330°

#2: $\frac{\text{PER}}{2}$ − #1 = 180 − −30 = 210°

6) $-4 + \sin\theta = -\dfrac{9}{2}$ → PER = 360°

$\sin\theta = -\frac{1}{2}$

#1: $\theta = -30$ + PER = 330°

#2: $\frac{\text{PER}}{2}$ − −1 = 180° − −30 = 210°

7) $-5 + \sin\theta = -5$ → PER = 360°

$\sin\theta = 0$

#1: $\theta = 0°$

#2: $\frac{\text{PER}}{2}$ − #1 = 180 − 0° = 180°

8) $-2 = -3 + \sin\theta$ → PER = 360°

$1 = \sin\theta$

#1: $90° = \theta$

#2: $\frac{\text{PER}}{2}$ − #1 = 180° − 90° = 90°

9) $5 + \cos -3\theta = 4$ → PER = 120° → 120°

$\cos -3\theta = -1$

$-3\theta = 180°$

#1: $\theta = -60$ + PERIOD = 60°

#2: PER − #1

$120 - -60 = 180°$

OTHERS:

$180° + 120° = 300°$ (PERIOD)

10) $1 + \cos 2\theta = \frac{2+\sqrt{3}}{2}$ PER = 180°

$\cos 2\theta = \frac{\sqrt{3}}{2}$

$2\theta = 30°$

#1: $\theta = 15°$

#2: PER − #1

$180 - 15 = 165°$

OTHERS:

11) $4 + \cos\frac{\theta}{2} = \frac{8+\sqrt{3}}{2}$ → PER = 720°

$\cos\frac{\theta}{2} = \frac{\sqrt{3}}{2}$

$\frac{\theta}{2} = 30°$

#1: $\theta = 60°$

#2: PER − #1 = 720 − 60 = 660 TOO BIG

12) $4 + \cos\frac{\theta}{4} = 5$ → PER = 1440°

$\cos\frac{\theta}{4} = 1$

$\frac{\theta}{4} = 0$

#1: $\theta = 0°$

#2: PER − #1 = 1440° − 0 = 1440° TOO BIG

13) $5 + \sin -3\theta = 6$ → PER = 120° → 120°

$\sin -3\theta = 1$

$-3\theta = 90°$

#1: $\theta = -30°$ + PER = 90°

#2: $\frac{\text{PER}}{2}$ − #1

$60° - -30° = 90°$

OTHERS:

$90 + 120 = 210°$ (PERIOD) $210° + 120° = 330°$ (PERIOD)

14) $\frac{10-\sqrt{2}}{2} = 5 + \sin 3\theta$ → PER = 120°

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

$-45 = 3\theta$

#1: $-15° = \theta$ + PER = 105°

#2: $\frac{\text{PER}}{2}$ − #1 = 60° − −15° = 75°

OTHERS:

$105 + 120 = 225°$ (PERIOD) $225° + 120° = 345°$ (PERIOD)

$75 + 120 = 195°$ $195° + 120° = 315°$

15) $4 = 4 + \sin 2\theta$ → PER = 180°

$0 = \sin 2\theta$

$0° = 2\theta$

#1: $0° = \theta$

#2: $\frac{\text{PER}}{2}$ − #1 = 90 − 0 = 90°

OTHERS:

$0 + 180 = 180°$ (PERIOD) $180° + 180° = 360°$ (PERIOD)

$90 + 180 = 270°$

16) $-4\sin -4\theta = 2\sqrt{3}$ → PER = 90° → 90°

$\sin -4\theta = \frac{-\sqrt{3}}{2}$

$-4\theta = -60$

#1: $\theta = 15°$

#2: $\frac{\text{PER}}{2}$ − #1 = 45 − 15° = 30°

OTHERS:

$15 + 90 = 105° + 90 = 195° + 90 = 285° + 90 = 375°$

$30 + 90 = 120° + 90 = 210° + 90 = 300°$