

## Solving Trig Equations I

Date \_\_\_\_\_

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Solve each equation for  $0 \leq \theta < 360$ . (Every 10 questions is a different level of difficulty.)

1)  $\frac{\sqrt{3}}{3} = \tan \theta$

2)  $\tan \theta = 1$

3)  $\sin \theta = 2$

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

5)  $\sin \theta = 0$

6)  $\cos \theta = -\sqrt{2}$

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

8)  $\frac{1}{2} = \sin \theta$

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

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

11)  $-\sin(\theta + 270) = 0$

12)  $-9\sin(\theta + 135) = 6\sqrt{3}$

13)  $5 + \sin(\theta + 30) = \frac{10 - \sqrt{2}}{2}$

14)  $-2\cos(\theta + 180) = 0$

15)  $\frac{10 + \sqrt{3}}{2} = 5 + \sin(\theta + 30)$

16)  $3 + \cos \frac{\theta}{3} = \frac{9 - 2\sqrt{3}}{3}$

17)  $-3\sqrt{2} = 6\sin 4\theta$

18)  $-4 = -8\sin(\theta + 60)$

19)  $4 + \sin(\theta + 90) = \frac{8 + \sqrt{2}}{2}$

20)  $\frac{8 + \sqrt{3}}{2} = 4 + \sin 4\theta$

21)  $-1 = -5 + 4\cos(-\theta + 135)$

22)  $-4 - 2\sin(2\theta + 90) = -6$

23)  $3 + \frac{2}{5} \cdot \sin(2\theta + 120) = \frac{14}{5}$

24)  $-3 - \sin(4\theta + 210) = -3$

25)  $-3 - 8\sin(3\theta + 30) = -7$

26)  $-5 = -5 - \sin(-3\theta + 90)$

27)  $3 + 4\sin(-4\theta + 180) = 7$

28)  $\frac{-12 - \sqrt{2}}{3} = -4 - \frac{2}{3} \cdot \cos(-4\theta + 90)$

29)  $-4 + \frac{2}{3} \cdot \sin\left(60 + \frac{\theta}{2}\right) = -\frac{11}{3}$

30)  $\frac{-20 + \sqrt{2}}{4} = -5 - \frac{1}{2} \cdot \cos(-3\theta + 240)$

## Answers to Solving Trig Equations I (ID: 1)

- |   |                                  |  |                  |
|---|----------------------------------|--|------------------|
| 1) {30, 210}  | 2) {45, 225}                     | 3) No solution.  | 4) {225, 315}    |
| 5) {0, 180}   | 6) No solution.                  | 7) {135, 225}  | 8) {30, 150}     |
| 9) {60, 300}  | 10) {30, 330}                    | 11) {90, 270}  | 12) No solution. |
| 13) {195, 285}  | 14) {90, 270}                    | 15) {30, 90}   | 16) No solution. |
| 17) $\left\{56\frac{1}{4}, 78\frac{3}{4}, 146\frac{1}{4}, 168\frac{3}{4}, 236\frac{1}{4}, 258\frac{3}{4}, 326\frac{1}{4}, 348\frac{3}{4}\right\}$ |                                  |  |                  |
| 18) {90, 330}   | 19) {45, 315}                    | 20) {15, 30, 105, 120, 195, 210, 285, 300}   |                  |
| 21) {135}   | 22) {0, 180}                     | 23) {45, 105, 225, 285}  |                  |
| 24) $\left\{37\frac{1}{2}, 82\frac{1}{2}, 127\frac{1}{2}, 172\frac{1}{2}, 217\frac{1}{2}, 262\frac{1}{2}, 307\frac{1}{2}, 352\frac{1}{2}\right\}$ |                                  |  |                  |
| 25) {0, 40, 120, 160, 240, 280}   | 26) {30, 90, 150, 210, 270, 330} | 27) $\left\{22\frac{1}{2}, 112\frac{1}{2}, 202\frac{1}{2}, 292\frac{1}{2}\right\}$ |                  |
| 28) $\left\{11\frac{1}{4}, 33\frac{3}{4}, 101\frac{1}{4}, 123\frac{3}{4}, 191\frac{1}{4}, 213\frac{3}{4}, 281\frac{1}{4}, 303\frac{3}{4}\right\}$ |                                  |  |                  |
| 29) {180}   | 30) {5, 35, 125, 155, 245, 275}  |  |                  |

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Solve each equation for  $0 \leq \theta < 360$ . (Every 10 questions is a different level of difficulty.)

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

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

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

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

5)  $\sqrt{3} = \tan \theta$

6)  $\tan \theta = -\frac{\sqrt{3}}{3}$

7)  $\cos \theta = -\frac{1}{2}$

8)  $\tan \theta = 1$

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

10)  $\cos \theta = -\sqrt{3}$

11)  $4\sqrt{3} = -8\cos \frac{\theta}{4}$

12)  $-2\sqrt{2} = -4\cos(\theta + 120)$

13)  $\frac{3}{2} = 2 + \sin -2\theta$

14)  $-3 + \cos -\theta = \frac{-6 - \sqrt{2}}{2}$

15)  $2\sin(\theta + 45) = -\sqrt{2}$

16)  $\frac{1}{2} \cdot \cos -4\theta = -\frac{1}{4}$

17)  $-\cos -\theta = 0$

18)  $\frac{11}{2} = 5 + \sin \frac{\theta}{3}$

19)  $-5 + \cos(\theta + 45) = -6$

20)  $3 + \sin 3\theta = \frac{6 - \sqrt{2}}{2}$

21)  $-1 - 2\cos(2\theta + 120) = 1$

22)  $-4 + \frac{1}{2} \cdot \cos\left(180 + \frac{\theta}{3}\right) = \frac{-16 - \sqrt{3}}{4}$

23)  $-1 + 8\cos(3\theta + 45) = -5$

24)  $\frac{12 + \sqrt{3}}{4} = 3 + \frac{1}{2} \cdot \cos(-2\theta + 330)$

25)  $1 - 2\cos(4\theta + 120) = 1$

26)  $-5 - 4\sin(-2\theta + 135) = -7$

27)  $\frac{-3 + \sqrt{2}}{3} = -1 + \frac{2}{3} \cdot \sin(2\theta + 225)$

28)  $-2 = -2 - \frac{1}{2} \cdot \sin(-2\theta + 135)$

29)  $3 + \frac{1}{2} \cdot \cos(-4\theta + 150) = \frac{11}{4}$

30)  $-1 + 2\sin(-4\theta + 60) = -1$

## Answers to Solving Trig Equations I (ID: 2)

- |   |                                   |                         |  |
|---|-----------------------------------|-------------------------|--|
| 1) {240, 300}   | 2) {210, 330}                     | 3) {150, 210}           | 4) {135, 225}  |
| 5) {60, 240}  | 6) {150, 330}                     | 7) {120, 240}           | 8) {45, 225}   |
| 9) No solution.   | 10) No solution.                  | 11) No solution.        | 12) {195, 285}   |
| 13) {15, 75, 195, 255}  | 14) {135, 225}                    | 15) {180, 270}          |  |
| 16) {30, 60, 120, 150, 210, 240, 300, 330}  | 17) {90, 270}                     | 18) {90}                |  |
| 19) {135}   | 20) {75, 105, 195, 225, 315, 345} | 21) {30, 210}           |  |
| 22) {90}  | 23) {25, 65, 145, 185, 265, 305}  | 24) {0, 150, 180, 330}  |  |
| 25) $\left\{37\frac{1}{2}, 82\frac{1}{2}, 127\frac{1}{2}, 172\frac{1}{2}, 217\frac{1}{2}, 262\frac{1}{2}, 307\frac{1}{2}, 352\frac{1}{2}\right\}$ |                                   |                         |  |
| 26) $\left\{52\frac{1}{2}, 172\frac{1}{2}, 232\frac{1}{2}, 352\frac{1}{2}\right\}$  |                                   | 27) {90, 135, 270, 315} | 28) $\left\{67\frac{1}{2}, 157\frac{1}{2}, 247\frac{1}{2}, 337\frac{1}{2}\right\}$ |
| 29) $\left\{7\frac{1}{2}, 67\frac{1}{2}, 97\frac{1}{2}, 157\frac{1}{2}, 187\frac{1}{2}, 247\frac{1}{2}, 277\frac{1}{2}, 337\frac{1}{2}\right\}$   |                                   |                         |  |
| 30) {15, 60, 105, 150, 195, 240, 285, 330}  |                                   |                         |  |

## Solving Trig Equations I

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Solve each equation for  $0 \leq \theta < 360$ . (Every 10 questions is a different level of difficulty.)

1)  $\sin \theta = 2$

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

3)  $0 = \cos \theta$

4)  $\frac{\sqrt{3}}{3} = \tan \theta$

5)  $-\frac{\sqrt{3}}{2} = \cos \theta$

6)  $1 = \sin \theta$

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

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

9)  $\tan \theta = -\frac{\sqrt{3}}{3}$

10)  $\tan \theta = \sqrt{3}$

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

12)  $4\cos 3\theta = -2\sqrt{3}$

13)  $-2\sin(\theta + 120) = 1$

14)  $\frac{6 + 2\sqrt{3}}{3} = 2 + \cos 4\theta$

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

16)  $4\sqrt{3} = -8\cos(\theta + 45)$

17)  $-2 = -2\cos -\theta$

18)  $-5 + \cos -\theta = \frac{-10 + \sqrt{2}}{2}$

19)  $4\sqrt{3} = -4\sin -\theta$

20)  $-4 + \cos \frac{\theta}{4} = \frac{-8 + \sqrt{3}}{2}$

21)  $-1 - \sin\left(120 + \frac{\theta}{2}\right) = \frac{-2 - \sqrt{3}}{2}$

22)  $2 + \sin(-4\theta + 225) = 1$

23)  $1 = 4 - 6\sin(-3\theta + 60)$

24)  $-4 = -4 - 3\sin\left(180 + \frac{\theta}{3}\right)$

25)  $3 - 6\sin(-\theta + 270) = 0$

26)  $-5 - 6\sin\left(90 + \frac{\theta}{2}\right) = -8$

27)  $-3 - \sin(3\theta + 150) = \frac{-6 + \sqrt{3}}{2}$

28)  $3 - \sin(-\theta + 135) = 2$

29)  $-2 + 2\sin(-3\theta + 30) = -4$

30)  $-5 = -5 + \cos\left(90 + \frac{\theta}{3}\right)$

## Answers to Solving Trig Equations I (ID: 3)

- 1) No solution.                      2)  $\{30, 330\}$                       3)  $\{90, 270\}$                       4)  $\{30, 210\}$   
5)  $\{150, 210\}$                       6)  $\{90\}$                       7)  $\{45, 315\}$                       8)  $\{60, 300\}$   
9)  $\{150, 330\}$                       10)  $\{60, 240\}$                       11) No solution.  
12)  $\{50, 70, 170, 190, 290, 310\}$                       13)  $\{90, 210\}$                       14) No solution.  
15)  $\{80, 100, 200, 220, 320, 340\}$                       16)  $\{105, 165\}$                       17)  $\{0\}$   
18)  $\{45, 315\}$                       19) No solution.                      20)  $\{120\}$                       21)  $\{0\}$   
22)  $\left\{78\frac{3}{4}, 168\frac{3}{4}, 258\frac{3}{4}, 348\frac{3}{4}\right\}$                       23)  $\{10, 90, 130, 210, 250, 330\}$                       24)  $\{0\}$   
25)  $\{120, 240\}$                       26)  $\{120\}$                       27)  $\{30, 50, 150, 170, 270, 290\}$   
28)  $\{45\}$                       29)  $\{40, 160, 280\}$                       30)  $\{0\}$