

# TRIGONOMETRY-EQUATIONS and IDENTITIES

C

1. Simplify:  $4 - 8\sin^2 6x$

- A.  $\cos 12x$
- B.  $2\cos 6x$
- C.  $4\cos 6x$
- D.  $4\cos 12x$

2. Solve:  $\sin x = \frac{1}{x}$   $0 \leq x < 2\pi$

- A.  $0, 1.56$
- B.  $1.11, 2.77$
- C.  $3.44, 6.11$
- D.  $0, 3.14, 6.28$

3. Solve:  $\tan x - \cos x = -2$   $0 \leq x < 2\pi$

- A.  $1.17, 4.10$
- B.  $1.97, 5.32$
- C.  $1.17, 1.57, 4.10, 4.71$
- D.  $1.57, 1.97, 4.71, 5.32$

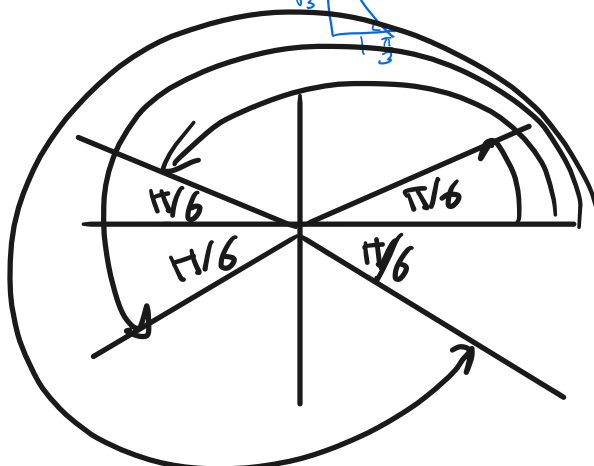
4. Solve:  $4\cos^2 x = 3$   $0 \leq x < 2\pi$

- A.  $\frac{\pi}{6}, \frac{11\pi}{6}$
- B.  $\frac{\pi}{3}, \frac{5\pi}{3}$
- C.  $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$
- D.  $\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

$4\cos^2 x = 3$   $\cos x = \frac{\sqrt{3}}{2}$   
 $\cos^2 x = \frac{3}{4}$   $\cos x = \pm \frac{\sqrt{3}}{2}$



$\frac{\pi}{6},$



$\pi - \frac{\pi}{6}$

$\frac{6\pi - \pi}{6} = \frac{5}{6}$

$\frac{\pi}{6}, \pi - \frac{\pi}{6}, \pi + \frac{\pi}{6}, 2\pi - \frac{\pi}{6}$

5. Determine an expression equivalent to  $\tan \theta + \cot \theta$ .

- A. 1
- B.  $\sin \theta \cos \theta$
- C.  $\sec \theta \csc \theta$
- D.  $\sin \theta + \cos \theta$

$$\frac{\sin \theta}{\cos \theta} + \frac{\cos \theta}{\sin \theta} = \frac{(\sin \theta)(\sin \theta)}{(\cos \theta)(\sin \theta)} + \frac{(\cos \theta)(\cos \theta)}{(\sin \theta)(\cos \theta)}$$

$$\frac{\sin^2 \theta + \cos^2 \theta}{\cos \theta \sin \theta}$$

$$\frac{1}{\cos \theta \sin \theta}$$

$$\sec \theta \csc \theta$$

6. Which expression is equivalent to  $6 \sin 8x \cos 8x$ ?

- A.  $\sin 8x$
- B.  $\sin 16x$
- C.  $3 \sin 4x$
- D.  $3 \sin 16x$

$$\sin(2\theta) = 2 \sin \theta \cos \theta$$

$$\sin(8x) = 2 \sin(4x) \cos(4x)$$

$$3 \cdot 2 \sin(2x) \cos(2x)$$

$$3 \cdot 2 \sin(8x) \cos(8x)$$

$$\sin(16x) = \frac{2 \sin(8x) \cos(8x)}{1}$$

7. Simplify:  $\frac{2 \sin \theta}{\sin 2\theta}$

- A. 1
- B.  $\cos \theta$
- C.  $\csc \theta$
- D.  $\sec \theta$

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

8. Solve:  $3 \sin x = x + 1$   $0 \leq x < 2\pi$

- A. 0.25
- B. 1.87, 2.87
- C. 0.54, 1.54
- D. 0.54, 1.87

$$\cos(0, 7) \times$$

$$(-4, 4) \quad y$$

9. Simplify:  $\sin\left(\frac{3\pi}{2} + x\right)$

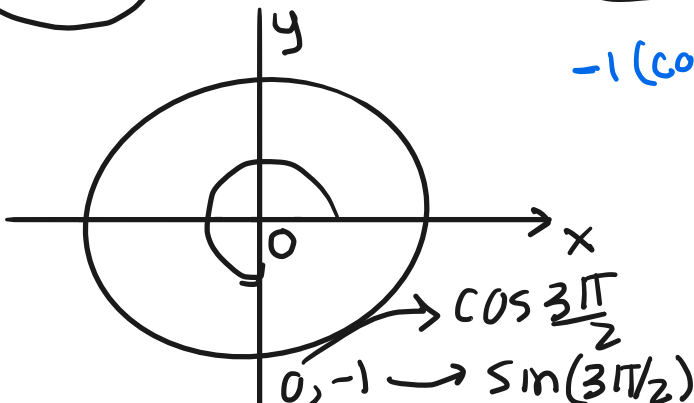
- A.  $\sin x$
- B.  $\cos x$
- C.  $-\sin x$
- D.  $-\cos x$

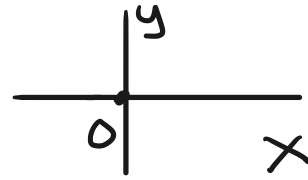
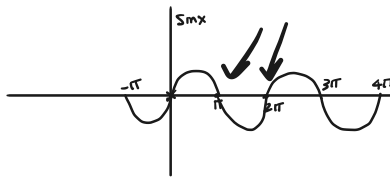
$$\sin(\alpha + \beta) = \sin \alpha \cos \beta + \cos \alpha \sin \beta$$

$$\sin \frac{3\pi}{2} \cos x + \sin x \cos \frac{3\pi}{2} = 0$$

$$-1(\cos x) + \sin x(0)$$

$$-\cos x$$





10. Solve:  $\sin^2 x = \sin x \cos x$   $0 \leq x < 2\pi$

A.  $x = 0, \frac{\pi}{4}$

B.  $x = \frac{\pi}{4}, \frac{5\pi}{4}$

C.  $x = 0, \frac{3\pi}{4}, \pi, \frac{7\pi}{4}$

D.  $x = 0, \frac{\pi}{4}, \pi, \frac{5\pi}{4}$

$$\sin^2 \theta - \sin \theta \cos \theta = 0$$

$$\sin \theta (\sin \theta - \cos \theta) = 0$$



$$\sin \theta = 0$$

$$x = 0 \quad x = \pi$$

$$\sin \theta = \cos \theta$$

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

$$\tan \theta = 1$$

$$\theta = \pi/4, 5\pi/4$$

- special triangle

11. Determine the general solution for:  $\sin 2x = -\frac{1}{2}$

A.  $\frac{7\pi}{12} + 2n\pi, \frac{11\pi}{12} + 2n\pi$  (n is any integer)

B.  $\frac{7\pi}{12} + n\pi, \frac{11\pi}{12} + n\pi$  (n is any integer)

C.  $\frac{13\pi}{12} + 2n\pi, \frac{21\pi}{12} + 2n\pi$  (n is any integer)

D.  $\frac{13\pi}{12} + n\pi, \frac{21\pi}{12} + n\pi$  (n is any integer)

$$\sin u = -1/2$$



$$2x = \frac{7\pi}{6} + 2n\pi$$

$$2x = \frac{11\pi}{6} + 2n\pi$$

$$x =$$

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$$2x = 7\pi/6$$

$$x = 7\pi/12 + n\pi$$

$$2x = 11\pi/6$$

$$x = 11\pi/12 + n\pi$$

Period of  $\sin(2x) = \pi$

12. Solve:  $\sin 2x - \cos x = 1$   $0 \leq x < 2\pi$

A. 0, 5.07

B. 3.14, 4.32

C. 3.14, 4.36

D. 0.42, 1.89, 2.95, 4.21

$$-2, 2$$



13. Solve:  $2\sin x + 1 = 0$   $0 \leq x < 2\pi$

A.  $-\frac{\pi}{6}, -\frac{5\pi}{6}$

B.  $\frac{\pi}{6}, \frac{5\pi}{6}$

C.  $\frac{7\pi}{6}, \frac{11\pi}{6}$

D.  $\frac{4\pi}{3}, \frac{5\pi}{3}$

$$y_1 = \sin 2x - \cos x$$

$$y_{min} = -2$$

$$y_{max} = 2$$

$$y_2 = 1$$

$$-2, 2$$

$$3\sin(2x) - 4\cos x$$

$$-3 - 4 = -7$$

14. Determine an expression equivalent to  $\frac{\tan \theta \csc^2 \theta}{\sec^2 \theta}$ .
- A.  $\tan \theta$
  - B.  $\cot \theta$
  - C.  $\tan^2 \theta$
  - D.  $\tan^3 \theta$
15. Simplify:  $\cos(\pi - 2x)$
- A.  $-\cos 2x$
  - B.  $-\sin 2x$
  - C.  $\cos 2x$
  - D.  $\sin 2x$
16. Determine a cosine equation that has the following general solution:  $\frac{\pi}{2} + n\pi$ ,  $\frac{\pi}{6} + 2n\pi$ ,  $\frac{11\pi}{6} + 2n\pi$ , where  $n$  is an integer.
- A.  $\cos x(2 \cos x + \sqrt{2}) = 0$
  - B.  $\cos x(2 \cos x + \sqrt{3}) = 0$
  - C.  $\cos x(2 \cos x - \sqrt{2}) = 0$
  - D.  $\cos x(2 \cos x - \sqrt{3}) = 0$

## **TRIGONOMETRY–EQUATIONS and IDENTITIES**

**C**

1. **D**
2. **B**
3. **B**
4. **C**
5. **C**
6. **D**
7. **D**
8. **D**
9. **D**
10. **D**
11. **B**
12. **C**
13. **C**
14. **B**
15. **A**
16. **D**