



MATHS

BOOKS - RS AGGARWAL MATHS (HINGLISH)

TRIGONOMETRIC EQUATIONS

Solved Examples

1. Find the principal solutions of the following

equations : $\sin x = \frac{1}{2}$

A. $\frac{\pi}{6}$

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

C. $\frac{\pi}{6}, -\frac{\pi}{6}$

D. None of these

Answer: B



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2. Find principal solutions of the following equations :

$$(i) \sin x = \frac{-\sqrt{3}}{2}$$

$$(ii) \cos x = \frac{-1}{2}$$

$$(iii) \cot x = -\sqrt{3}$$



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3. In each of the following , find the general value of x satisfying the equation :

$$(i) \sin x = \frac{1}{\sqrt{2}}$$

$$(ii) \cos x = \frac{1}{2}$$

$$(iii) \tan x = \frac{1}{\sqrt{3}}$$



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4. Find the principal value of x for which

$$\sqrt{3} \operatorname{cosec}(x) = 2.$$

A. $\frac{\pi}{6}$

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

C. $\frac{\pi}{3}, \frac{2\pi}{3}$

D. None of these

Answer: D



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5. In each of the following , find the general value of x satisfying the equation :

$$(i) \sin x = \frac{-\sqrt{3}}{2}$$

$$(ii) \cos x = \frac{-1}{2}$$

$$(iii) \cot x = -\sqrt{3}$$



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6. Find the general solution of each equation :

$$(i) \sqrt{3} \cot x + 1 = 0$$

$$(ii) \operatorname{cosec} x + \sqrt{2} = 0$$





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7. Find the general solution of each of the equations :

$$(i) \sin 2x = -\frac{1}{2}$$

$$(ii) \tan 3x = -1$$



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8. Find the general solution of each of the equations :

$$(i) 4\sin^2 x = 1$$

$$(ii) 2 \cos^2 x = 1$$

$$(iii) \cot^2 x = 3$$



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9. Find the general solution of the equation

$$\sin 2x + \sin 4x + \sin 6x = 0.$$



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10. Solve : $2 \cos^2 x + 3 \sin x = 0.$



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11. Find the general solution for each of the following equations :

(i) $\cos 4x = \cos 2x$

(ii) $\cos 3x = \sin 2x$

(iii) $\sin 3x + \cos 2x = 0$

(iv) $\sin mx + \sin nx = 0$



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12. Solve : $\sqrt{3} \cos x - \sin x = 1$.



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13. Solve : $\sec x - \tan x = \sqrt{3}$.



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Exercise

1. Find the principal solutions of each of the following equations :

(i) $\sin x = \frac{\sqrt{3}}{2}$

$$(ii) \cos x = \frac{1}{2}$$

$$(iii) \tan x = \sqrt{3}$$

$$(iv) \cot x = \sqrt{3}$$

$$(v) \operatorname{cosec} x = \sqrt{3}$$

$$(vi) \sec x = \frac{2}{\sqrt{3}}$$



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2. Find the principal solutions of each of the following equations :

$$(i) \sin x = \frac{-1}{2}$$

$$\sin \frac{3x}{2} = 0$$

$$(iii) \sin\left(x + \frac{\pi}{5}\right) = 0$$

$$(iv) \cos 2x = 0$$

$$(v) \cos \frac{5x}{2} = 0$$

$$(vi) \cos\left(x + \frac{\pi}{10}\right) = 0$$



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3. Find the general solution of each of the following equations :

$$(i) \sin 3x = 0$$

$$(ii) \sin \frac{3x}{2} = 0$$

$$(iii) \left(x + \frac{\pi}{5}\right) = 0$$

$$(iv) \cos 2x = 0$$

$$(v) \cos \frac{5x}{2} = 0$$

$$(vi) \cos \left(x + \frac{\pi}{10} \right) = 0$$

$$(vii) \tan 2x = 0$$

$$(viii) \tan \left(3x + \frac{\pi}{6} \right) = 0$$

$$(ix) \tan \left(2x - \frac{\pi}{4} \right) = 0$$



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$$4. (i) \sin x = \frac{\sqrt{3}}{2}$$

$$(ii) \cos x = 1$$

$$(iii) \sec x = \sqrt{2}$$



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5. (i) $\cos x = \frac{-1}{2}$

(ii) $\operatorname{cosec} x = -\sqrt{2}$

(iii) $\tan x = -1$



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6. Find general solution of $\sin 2x = \frac{1}{2}$

A. $x = n\pi + (-1)^n \cdot \frac{\pi}{12}, n \in I$

B. $x = \frac{n\pi}{2} + (-1)^n \cdot \frac{\pi}{6}, n \in I$

$$C. x = n\pi + (-1)^n \cdot \frac{\pi}{6}, n \in I$$

$$D. x = \frac{n\pi}{2} + (-1)^n \cdot \frac{\pi}{12}, n \in I$$

Answer: D



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$$7. (i) \sec 3x = -2$$

$$(ii) \cot 4x = -1$$

$$(iii) \operatorname{cosec} 3x = \frac{-2}{\sqrt{3}}$$



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8. (i) $4 \cos^2 x = 1$

(ii) $4 \sin^2 x - 3 = 0$

(iii) $\tan^2 x = 1$



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9. (i) $\cos 3x = \cos 2x$

(ii) $\cos 5x = \sin 3x$

(iii) $\cos mx = \sin nx$



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10. General solution of $\sin x = \tan x$

A. $\frac{n\pi}{2}$

B. $n\pi + \left(\frac{\pi}{4}\right)$

C. $\frac{3n\pi}{2}$

D. $2n\pi$

Answer: D



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11. $4 \sin x \cos x + 2 \sin x + 2 \cos x + 1 = 0$



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$$12. \sec^2 2x = 1 - \tan 2x$$



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$$13. \tan^3 x - 3 \tan x = 0$$



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$$14. \sin x + \sin 3x + \sin 5x = 0$$



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15. solve: $\sin x \tan x - 1 = \tan x - \sin x$



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16. $\cos x + \sin x = 1$



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17. $\cos x - \sin x = -1$



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18. $\sqrt{3} \cos x + \sin x = 1$



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19. $2 \tan x - \cot x + 1 = 0$



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20. $\sin x \tan x - 1 = \tan x - \sin x$



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$$21. \cot x + \tan x = 2\operatorname{cosec} x$$



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