MATHS

BOOKS - JBD PUBLICATION

TRIGNOMETRIC FUNCTIONS

Exercise

1. The value of $\dfrac{\cos 7x + \cos 5x}{\sin 7x - \sin 5x}$ is:

A. cot x

B. tan x

C. sin 6x

D. cos 6x

Answer:

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2. For any real number of x and y, if cos x=cos y then:

A. $x = n\pi + (-1)^n y$

B. $x = 2n\pi \pm y$

C. $x = n\pi \pm y$

D. x=npi+y`

Answer:

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3. Radian measure of $\angle 105^\circ$ is:

A. $\dfrac{7\pi}{12}$

B. $\dfrac{\pi}{12}$

C. $-\dfrac{7\pi}{12}$

D. none of these

Answer:

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4. The value of $\cos 75°$ is:

A. $\dfrac{\sqrt{3}+1}{2\sqrt{2}}$

B. $\dfrac{1-\sqrt{3}}{2\sqrt{2}}$

C. $\dfrac{\sqrt{3}-1}{2\sqrt{2}}$

D. $\dfrac{\sqrt{3}+1}{2}$

Answer:

5. If $\sin\theta = -\dfrac{1}{2}$ and $\cos\theta = \dfrac{\sqrt{3}}{2}$, then θ lies in:

A. 1st quadrant

B. IInd quadrant

C. IIIrd quadrant

D. Ivth quadrant

Answer:

6. The value of $\dfrac{1 - \tan^2 15°}{1 + \tan^2 15°}$ is equal to:

A. 1

B. $\sqrt{3}$

C. $\dfrac{\sqrt{3}}{2}$

D. 2

Answer:

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7. The value of $\dfrac{\cot 54^\circ}{\tan 36^\circ} + \dfrac{\tan 20^\circ}{\cot 70^\circ}$ is equal to:

A. 0

B. 2

C. 1

D. 3

Answer:

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8. The value of $\sin^2 75° - \sin^2 15°$ is equal to:

A. $\dfrac{\sqrt{3}}{2}$

B. 0

C. $\dfrac{1}{2}$

D. 1

Answer:

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9. If $\sin \theta = \dfrac{1}{2}$ and $\cos \theta = -\dfrac{\sqrt{3}}{2}$, then the general value of θ is:

A. $2n\pi + 5\dfrac{\pi}{6}$

B. $2n\pi + \dfrac{\pi}{4}$

C. $2n\pi + \dfrac{\pi}{6}$

D. $2n\pi \pm \dfrac{\pi}{4}$

Answer:

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10. The radius of a circle whose arc of length 20π subtends an angle of $\dfrac{2\pi}{3}$ radians at the centre is:

A. 25 cm

B. 30 cm

C. 35 cm

D. none of these

Answer:

11. If the angles of a triangle are in the ratio 3:4:5, then the greatest angle in radians is:

A. $\dfrac{\pi}{3}$

B. $\dfrac{2\pi}{3}$

C. $\dfrac{5\pi}{12}$

D. none of these

Answer:

12. The angle between the minute and hour hands of a clock at

$5:40$ is

   A. $70°$

   B. $85°$

   C. $55°$

   D. none of these

Answer:

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13. A wheel makes 180 revolution in 1 minute. The angle in radians

through which it will turn in 1 second is:

   A. 2π

B. 3π

C. 6π

D. none of these

Answer:

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14. If θ and ϕ are acute angles such that $\cos\theta = \dfrac{13}{14}$ and $\cos\phi = \dfrac{1}{7}$, then value of $(\theta - \phi)$ is equal to:

A. $-\dfrac{\pi}{3}$

B. $\dfrac{\pi}{3}$

C. $\dfrac{\pi}{2}$

D. none of these

Answer:

15. The value of

$\cos(70° + x)\cos(10° + x) + \sin(70° + x)\sin(10° + x)$ is

equal to:

A. 0

B. $\dfrac{3}{2}$

C. $\dfrac{1}{2}$

D. none of these

Answer:

16. The value of $\sec\left(\dfrac{\pi}{4} + \alpha\right)\sec\left(\dfrac{\pi}{4} - \alpha\right)$ is equal to:

A. $2\sec 2\alpha$

B. $\tan 2\alpha$

C. $2\cot \alpha$

D. $2\cos 2\alpha$

Answer:

17. If $\alpha + \beta = \dfrac{\pi}{2}$, then the maximum value of $\cos \alpha \cos \beta$ is:

A. 0

B. 1

C. $\dfrac{1}{2}$

D. $\dfrac{1}{4}$

Answer:

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18. $\sin 36^\circ \sin 72^\circ \sin 108^\circ \sin 144^\circ$ is equal to:

A. $\dfrac{1}{16}$

B. $\dfrac{3}{16}$

C. $\dfrac{5}{16}$

D. none of these

Answer:

19. The value of $\dfrac{\sin \pi}{14} \dfrac{\sin(3\pi)}{14} \dfrac{\sin(5\pi)}{14}$ is equal to:

A. 0

B. $\dfrac{1}{2}$

C. $\dfrac{1}{4}$

D. $\dfrac{1}{8}$

Answer:

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20. If $0 \le x \le \pi$ and $\cos x = -\dfrac{4}{5}$ then $\cos\left(\dfrac{x}{2}\right)$ is equal to:

A. $\dfrac{3}{\sqrt{10}}$

B. $-\dfrac{3}{\sqrt{10}}$

C. $\dfrac{1}{\sqrt{10}}$

D. none of these

Answer:

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21. $\cos 12° \cos 24° \cos 36° \cos 48° \cos 72° \cos 84°$ is equal to:

A. $\dfrac{1}{16}$

B. $\dfrac{1}{64}$

C. $\dfrac{1}{128}$

D. none of these

Answer:

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22. The number of solutions of the equations $\tan\theta + \sec\theta = 2\cos\theta$ lying in the interval $[0, 2\pi]$ is:

A. 2

B. 3

C. 1

D. none of these

Answer:

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23. The solutions of the equation $\sin^2 x + 3\sin x = 0$ is:

A. π

B. $\dfrac{3\pi}{4}$

C. $\dfrac{\pi}{3}$

D. none of these

Answer:

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24. Equations sinx+cos x = 2has

    A. one solutions

    B. two solutions

    C. three solutions

    D. none of these

Answer:

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25. If $A - B = \dfrac{\pi}{4}$ the (1+tanA)(1-tanB) is equal to:

A. 2

B. 1

C. 0

D. 3

Answer:

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26. If A+B+C=180^@$then$(tanA+tanB+tanC)/(tanAtanBtanC)` is equal to:

A. tanAtanBtanC

B. 0

C. 1

D. none of these

Answer:

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27. Which of the following number is rational?

A. $\sin 15^\circ$

B. $\cos 15^\circ$

C. $\sin 15^\circ \cos 15^\circ$

D. $\sin 15^\circ \cos 75^\circ$

Answer:

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1. Prove that: $\cos(x + 135°) - \cos(x - 135°) = -\sqrt{2}\sin x$

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2. Find the solutions of the equation $\sin x = -\dfrac{\sqrt{3}}{2} when x \in [0, \pi]$

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3. Prove that: $\dfrac{\cos 7x + \cos 5x}{\sin 7x - \sin 5x} = \cot x$

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4. Prove that: sin3x=3sinx-4sin^3x

5. Prove the following: $\dfrac{\sin x + \sin 3x}{\cos x + \cos 3x} = \tan 2x$

6. Find the radian measures corresponding to the following degree measure: $-47° \, 30'$

7. Find the radian measures corresponding to the followind degree measures:

$240°$

8. A wheel makes 360 revolutions in one minute. Through how many radians does it turn in one second?

9. A circular wire of radius 7.5 cm is cut and bent so as to lie along the circumference of a circular hoop whose radius is 120 cm, find in degrees, the angle which is subtended at the centre of this loop.

10. Find the values of other five trignometrtic functions in each of the following:

$\cos x = -\dfrac{1}{2}$, x lies in third quadrant.

11. Find the values of other five trignometrtic functions in each of the following:

$\cot x = -\dfrac{3}{4}$, x lies in third quadrant.

12. Find the values of the trignometric functions in the following:

$\cos ec(-1410°)$.

13. Find the values of the trignometric functions in the following:

$\dfrac{\tan(19\pi)}{3}$.

14. Find the values of:

$$\sin\left(\frac{-11\pi}{3}\right)$$

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15. Show that no value of θ can satisfy the equations:

$$6\sec^2\theta - 5\sec\theta - 1 = 0$$

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16. Find the value of:

$$\cos\left(\frac{5\pi}{12}\right)$$

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17. Find the value of:

$$\tan\left(\frac{13\pi}{12}\right)$$

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18. Prove the following:

$$\cos\left(\frac{\pi}{4} - x\right)\cos\left(\frac{\pi}{4} - y\right) - \sin\left(\frac{\pi}{4} - x\right)\sin\left(\frac{\pi}{4} - y\right) = \sin(x + y)$$

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19. Prove the following: $\sin^2 6x - \sin^2 4x = \sin 2x \sin 10x$

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20. Prove the following: $\cos^2 2x - \cos^2 6x = \sin 4x \sin 8x$

21. Show that: $\tan 5x - \tan 3x - \tan 2x = \tan 5x \tan 3x \tan 2x$

22. If $A + B = 45°$, then shown that $(1 + \tan A)(1 + \tan B) = 2$.

23. Prove that $\tan 2x = \dfrac{2 \tan x}{1 - \tan^2 x}$

24. Prove that: $\dfrac{\sin 2x}{1 + \cos 2x} = \tan x$

25. Show tha:

$$\cos 4A = 1 - 8\cos^2 A + 8\cos^4 A.$$

26. Show tha:

$$\cos 6A = 32\cos^6 A - 48\cos^4 A + 18\cos^2 A - 1$$

27. Prove the following: $\dfrac{\sin 5x + \sin 3x}{\cos 5x + \cos 3x} = \tan 4x$

28. Prove the following:$\sin(150° + x) + \sin(150° - x) = \cos x$

29. Prove that $\sin 51° + \cos 81° = \cos 21°$.

30. Show that:

$sn 10° + \sin 20° + \sin 40° + \sin 50° = \sin 70° + \sin 80°$

31. Find the principal solutions $(0 \le x \le 2\pi)$ of the following euqtions:

$\cos x = -\dfrac{1}{\sqrt{2}}$

32. Find the principal solutions $(0 \le x \le 2\pi)$ of the following euqtions:

$\tan x = -\sqrt{3}.$

33. Find the principal and general solutions of the following equation:- $\tan x = \sqrt{3}$

34. Find the principal and general solutions of the following equation:- $\sec x = 2$

35. Find the general solution of the following equations:

$$\cos 4x = \cos 2x$$

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36. Find the general solutions of the equations sinx+sin3x+sin5x=0.

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37. Find the general solution of the following equations:

$$\cos 4x = \cos 2x$$

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38. An athlete runs 4 times around a circular running a path to describe 1760 metres. What is the angle in radians degrees subtended at the centre of the circle, when he had runs a distance of 308 metres?

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39. Prove that: $\cot^2 \dfrac{\pi}{6} + \cos ec\dfrac{5\pi}{6} + 3\tan^2 \dfrac{\pi}{6} = 6$

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40. In $\triangle ABC$, prove that

cos(A+B)+cosC=0

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41. In $\triangle ABC$, prove that

$$\cos\left(\frac{A+B}{2}\right) = \frac{\sin C}{2}$$

42. Prove the following:

$$\cos\left(\frac{3\pi}{2} + x\right)\cos(2\pi + x)\left[\cot\left(\frac{3\pi}{2} - x\right) + \cot(2\pi + x)\right] = 1$$

43. If $\tan\alpha = \frac{m}{m+1}$ and $\tan\beta = \frac{1}{2m+1}$, the find the value of $\alpha + \beta$.

44. If $\tan(\alpha + \theta) = n\tan(\alpha - \theta)$, show that:

$(n + 1)\sin 2\theta = (n - 1)\sin 2\alpha.$

45. Prove that: $\dfrac{1 + \sin 2x - \cos 2x}{1 + \sin 2x + \cos 2x} = \tan x$

46. Show that

$$\sqrt{2 + \sqrt{2 + \sqrt{2 + 2\cos 8}}} = 2\cos\theta$$

47. Find $\sin \dfrac{x}{2}$, $\cos \dfrac{x}{2}$ and $\tan \dfrac{x}{2}$ in the following:- $\tan x = -\dfrac{4}{3}$,

x in quadrant II

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48. Find $\sin \dfrac{x}{2}$, $\cos \dfrac{x}{2}$ and $\tan \dfrac{x}{2}$ in the following:- $\cos x = -\dfrac{1}{3}$,

x in quadrant III

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49. Prove the following: $\dfrac{\cos 4x + \cos 3x + \cos 2x}{\sin 4x + \sin 3x + \sin 2x} = \cot 3x$

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50. Show that: $\dfrac{\sin 11x \sin x + \sin 7x \sin 3x}{\cos 11x \sin x + \cos 7x \sin 3x} = \tan 8x$

51. Prove the following:

$$\sin 2x + 2\sin 4x + \sin 6x = 4\cos^2 x \sin 4x$$

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

$$2\cos^2 x - 5\cos x + 2 = 0$$

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

$$4\sin^2 \theta - 8\cos \theta + 1 = 0$$

54. Find the general solution of the following equations:

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

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55. Find the general solution of the following trignometric equations:

tanx+tan2x+tanx tan2x=1

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56. Find the general solution of the following trignometric equations:

$$\tan^2 \theta + \cot^2 \theta = 2$$

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57. Prove that:

$$(\cos x - \cos y)^2 + (\sin x - \sin y)^2 = 4\sin^2 \frac{x-y}{2}$$

58. If $\sin x = \dfrac{3}{5}$, $\cos y = -\dfrac{12}{13}$, where x and y both lie in second quadrant, find the value of sin(x+y).

59. Prove that:

$$(\cos x - \cos y)^2 + (\sin x - \sin y)^2 = 4\sin^2 \frac{x-y}{2}$$

60. Show that: $\dfrac{\sin^2 \pi}{8} + \dfrac{\sin^2(3\pi)}{8} + \dfrac{\sin^2(5\pi)}{8} + \dfrac{\sin^2(7\pi)}{8} = 2$

61. Show that: $\dfrac{\cos\left(\frac{3\pi}{4}\right) - \cos\left(\frac{2\pi}{3}\right)}{\cos\left(\frac{3\pi}{4}\right) + \cos\left(\frac{2\pi}{3}\right)} = 3 - 2\sqrt{2}.$

62. Prove that: $\cos A.\cos\left(\dfrac{\pi}{3} - A\right).\cos\left(\dfrac{\pi}{3} + A\right) = \dfrac{1}{4}\cos 3A$

63. Prove that: $\tan\left(\dfrac{x}{2}\right) = \pm\sqrt{\dfrac{1 - \cos x}{1 + \cos x}}$

64. Find the value of: $\cos\left(\dfrac{\pi}{8}\right)$

65. If $\cos x = \dfrac{1}{2}\left(a + \dfrac{1}{a}\right)$, show that:

$\cos 2x = \dfrac{1}{2}\left(a^2 + \dfrac{1}{a^2}\right)$

66. If $\cos x = \dfrac{1}{2}\left(a + \dfrac{1}{a}\right)$, show that:

$\cos 3x = \dfrac{1}{2}\left(a^3 + \dfrac{1}{a^3}\right)$

67. Prove that:

$$\cos 2x \cos\left(\frac{x}{2}\right) - \cos 3x \cos\left(\frac{9x}{2}\right) = \sin 5x \sin\left(\frac{5x}{2}\right)$$

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