MATHS

BOOKS - PSEB

TRIGONOMETRIC FUNCTIONS

Exercise

1. Find the radian measures corresponding to the following degree measure: $25°$

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

3. Find the radian measures corresponding to the following degree measure: $240°$

4. Find the radian measures corresponding to the following degree measure: $520°$

5. Find the degree measures corresponding to the following radian measure (Use $\pi = \dfrac{22}{7}$):- $\dfrac{11}{16}$

6. Find the degree measures corresponding to the following radian measure (Use $\pi = \dfrac{22}{7}$):- -4

7. Find the degree measures corresponding to the following radian measure (Use $\pi = \dfrac{22}{7}$):- $\dfrac{5\pi}{3}$

8. Find the degree measures corresponding to the following radian measure (Use $\pi = \dfrac{22}{7}$):- $\dfrac{7\pi}{6}$

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

10. Find the degree measure of the angle subtended at the centre of a circle of radius 100 cm by an arc of length 22 cm (Use $\pi = \dfrac{22}{7}$).

11. In a circle of diameter 40 cm, the length of a chord is 20 cm. Find the length of minor arc of the chord.

12. If in two circles, arcs of the same length subtend angles $60°$ and $75°$ at the centre, find the ratio of their radii.

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13. Find the angle in radian through which a pendulum swings if itslength is 75 cm and the tip describes an arc of length:- 10 cm

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14. Find the angle in radian through which a pendulum swings if itslength is 75 cm and the tip describes an arc of length:- 15 cm

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15. Find the angle in radian through which a pendulum swings if itslength is 75 cm and the tip describes an arc of length:- 21 cm

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16. Find the values of the trigonometric function:- $\cos x = -\dfrac{1}{2}$, x lies in third quadrant.

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17. Find the values of the trigonometric function:- $\sin x = \dfrac{3}{5}$, x lies in second quadrant.

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18. Find the values of the trigonometric function:- $\cot x = \dfrac{3}{4}$,x lies in third quadrant.

19. Find the values of the trigonometric function:- $\sec x = \dfrac{13}{5}$, x lies in fourth quadrant.

20. Find the values of the trigonometric function:- $\tan x = -\dfrac{5}{12}$, x lies in second quadrant.

21. Find the values of the trigonometric function:- $\sin 765°$

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22. Find the values of the trigonometric function:- $\cos ec(- 1410°)$

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23. Find the values of the trigonometric function:- $\tan \dfrac{19\pi}{3}$

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24. Find the values of the trigonometric function:- $\sin\left(- \dfrac{11\pi}{3} \right)$

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25. Find the values of the trigonometric function:- $\cot\left(-\dfrac{15\pi}{4}\right)$

26. Prove that: $\sin^2\dfrac{\pi}{6} + \cos^2\dfrac{\pi}{3} - \tan^2\dfrac{\pi}{4} = -\dfrac{1}{2}$

27. Prove that: $2\sin^2\dfrac{\pi}{6} + \cos ec^2\dfrac{7\pi}{6}\cos^2\dfrac{\pi}{3} = \dfrac{3}{2}$

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

29. Prove that: $2\sin^2\dfrac{3\pi}{4} + 2\cos^2\dfrac{\pi}{4} + 2\sec^2\dfrac{\pi}{3} = 10$

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30. Find the value of : $\sin 75^\circ$

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31. Find the value of : $\tan 15^\circ$

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32. Prove the following:

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

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33. Prove the following: $\dfrac{\tan\left(\frac{\pi}{4} + x\right)}{\tan\left(\frac{\pi}{4} - x\right)} = \left(\dfrac{1 + \tan x}{1 - \tan x}\right)^2$

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34. Prove the following: $\dfrac{\cos(\pi + x)\cos(-x)}{\sin(\pi - x)\cos\left(\frac{\pi}{2} + x\right)} = \cot^2 x$

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35. Prove the following:

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

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36. Prove the following:

$$\sin(n + 1)x \sin(n + 2)x + \cos(n + 1)x \cos(n + 2)x = \cos x$$

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37. Prove the following:

$$\cos\left(\frac{3\pi}{4} + x\right) - \cos\left(\frac{3\pi}{4} - x\right) = -\sqrt{2}\sin x$$

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

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

40. Prove the following:

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

41. Prove the following:

$$\cot 4x(\sin 5x + \sin 3x) = \cot x(\sin 5x - \sin 3x)$$

42. Prove the following: $\dfrac{\cos 9x - \cos 5x}{\sin 17x - \sin 3x} = -\dfrac{\sin 2x}{\cos 10x}$

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

44. Prove the following: $\dfrac{\sin x - \sin y}{\cos x + \cos y} = \tan \dfrac{x - y}{2}$

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

46. Prove the following: $\dfrac{\sin x - \sin 3x}{\sin^2 x - \cos^2 x} = 2 \sin x$

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

48. Prove the following:

$\cot x \cot 2x - \cot 2x \cot 3x - \cot 3x \cot x = 1$

49. Prove the following: $\tan 4x = \dfrac{4 \tan x \left(1 - \tan^2 x\right)}{1 - 6 \tan^2 x + \tan^4 x}$

50. Prove the following: $\cos 4x = 1 - 8 \sin^2 x \cos^2 x$

51. Prove the following:

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

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

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

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

55. Find the principal and general solutions of the following equation:- $\cos ecx = -2$

56. Find the general solution of the following equations: $\cos 4x = \cos 2x$

57. Find the general solution of the following equations:

$\cos 3x + \cos x - \cos 2x = 0$

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58. Find the general solution of the following equations:

$\sin 2x + \cos x = 0$

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59. Find the general solution of the following equations:

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

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60. Find the general solution of the following equations:

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

61. Prove that: $2\cos\dfrac{\pi}{13}\cos\dfrac{9\pi}{13} + \cos\dfrac{3\pi}{13} + \cos\dfrac{5\pi}{13} = 0$

62. Prove that: $(\sin 3x + \sin x)\sin x + (\cos 3x - \cos x)\cos x = 0$

63. Prove that:

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

64. **Prove** **that:**

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

65. **Prove** **that:**

$$\sin x + \sin 3x + \sin 5x + \sin 7x = 4\cos x \cos 2x \sin 4x$$

66. Prove that: $\dfrac{(\sin 7x + \sin 5x) + (\sin 9x + \sin 3x)}{(\cos 7x + \cos 5x) + (\cos 9x + \cos 3x)} = \tan 6x$

67. Prove that: $\sin 3x + \sin 2x - \sin x = 4 \sin x \cos \dfrac{x}{2} \cos \dfrac{3x}{2}$

68. 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

69. 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

70. Find $\sin \dfrac{x}{2}$, $\cos \dfrac{x}{2}$ and $\tan \dfrac{x}{2}$ in the following:- $\sin x = \dfrac{1}{4}$, x in quadrant II