MATHS

NCERT - FULL MARKS MATHEMATICS(TAMIL)

TRIGONOMETRY

Example

1. Prove that $\dfrac{\tan\theta + \sec\theta - 1}{\tan\theta - \sec\theta + 1} = \dfrac{1 + \sin\theta}{\cos\theta}$

▶ View Text Solution

2. Prove that

$(\sec A - \cos ecA)(1 + \tan A + \cot A) = \tan A \sec A - \cot A \cos ecA$

.

3. Eliminate θ from $a\cos\theta = b$ and $c\sin\theta = d$, wher a,b,c,d are constants.

4. Convert $18°$ to radians

5. Convert $-108°$ to radians

6. Convert $\dfrac{\pi}{5}$ radians to degrees

7. Convert 6 radians to degrees

8. Find the length of an are of a circle of radius 5 cm subtending a central angle measuring $15°$.

9. If the arcs of same lengths in two circles subtend cenral angle $30°$ and $80°$ find the ratio of their radii.

10. The terminal side of an angle θ in standard position passes through the point (3,-4). Find the six trigonometric function values at an angle θ

> ▶ View Text Solution

11. If $\sin\theta = \dfrac{3}{5}$ and the angle θ is in the second quadrant, then find the values of other five trigonometric functions.

> ▶ View Text Solution

12. Find the values of $\sin(-45°)$

> ▶ View Text Solution

13. Find the values of $\cos(-45°)$

14. Find the values of $\cot(-45^\circ)$

15. Find the values of $\sin 150^\circ$

16. Find the values of $\cos 135^\circ$

17. Find the values of $\tan 120^\circ$

18. Find the value of

$\sin 765\,^\circ$

19. Find the value of

$\cos ec(\,-\,1410\,^\circ\,)$

20. Find the value of

$\cot\left(\dfrac{-\,15\pi}{4}\right)$

21. Prove that $\tan 315^2 \cot(-405^\circ) + \cot 495^\circ \tan(-585^\circ) = 2$

22. Determine whether the following functions are even, odd or neither

$\sin^2 x - 2\cos^2 x - \cos x$

23. Determine whether the following functions are even, odd or neither

$\sin(\cos(x))$

24. Determine whether the following functions are even, odd or neither

$\cos(\sin(x))$

▶ View Text Solution

25. Determine whether the following functions are even, odd or neither

$\sin x + \cos x$

▶ View Text Solution

26. Find the values of $\cos 15°$

▶ View Text Solution

27. Find the values of $\tan 165^\circ$

28. If $\sin x = \dfrac{4}{5}$ (in I quadrant) and $\cos y = \dfrac{-12}{13}$ (in II quadrant).

Then find (i) $\sin(x - y)$ (ii) $\cos(x - y)$

29. Prove that $\cos\left(\dfrac{3\pi}{4} + x\right) - \cos\left(\dfrac{3\pi}{4} - x\right) = -\sqrt{2}\sin x$

30. Point A(9,12) rotates around the origin O in a plane through 60° in the angiclockwise direction to a new position B. Find the coordinates of the point B.

31. A ripple tank demonstrates the effect of two water waves being added together. The two wave are described by h=8 cos t and h=6 sin t, where $t \in [0, 2\pi]$ is in seconds and h is the height in millimeters above still water. Find the maximum height of the resultant wave and teh value of at which it occurs.

32. Expand $\sin(A + B + C)$

33. Expand $\tan(A + B + C)$

34. A foot bal player can kick a footbal from ground level with an initial velocity of 80 ft/ second. Find the maximum horizontal distance the football travels and at what angle? (Take g=32).

▶ View Text Solution

35. Find the value of $\sin\left(22\dfrac{1}{2}^\circ\right)$

▶ View Text Solution

36. Find the value of $\sin 2\theta$ when $\sin\theta = \dfrac{12}{13}\theta$ lies in the first quadrant.

▶ View Text Solution

37. Prove that $\sin 4A = 4\sin A \cos^2 A - 4\cos A \sin^3 A$

38. Prove that

$$\sin x = 2^{10} \sin\left(\frac{x}{2^{10}}\right) \cos\left(\frac{x}{2}\right) \cos\left(\frac{x}{2^2}\right) \ldots \cos\left(\frac{x}{2^{10}}\right)$$

39. Prove that $\dfrac{\sin\theta + \sin 2\theta}{1 + \cos\theta + \cos 2\theta} = \tan\theta$

40. Prove that $1 - \dfrac{1}{2}\sin 2x = \dfrac{\sin^3 x + \cos^3 x}{\sin x + \cos x}$

41. Find x such that $-\pi \leq x \leq \pi$ and $\cos 2x = \sin x$

▶ View Text Solution

42. Find the values of

$\sin 18°$

▶ View Text Solution

43. Find the values of

$\cos 18°$

▶ View Text Solution

44. Find the values of

$\sin 72°$

45. Find the values of

$\cos 36°$

46. Find the values of

$\sin 54°$

47. If $\tan\dfrac{\theta}{2} = \sqrt{\dfrac{1-a}{1+a}}\tan\dfrac{\phi}{2}$ then prove that $\cos\phi = \dfrac{\cos\theta - a}{1 - a\cos\theta}$

48. Find the value of $\sqrt{3}\cos ec20^\circ - \sec 20^\circ$

49.   Prove   that

$$\cos A \cos 2A \cos 2^2 A \cos 2^3 A \ldots \ldots \ldots \ldots \cos 2^{n-1} A = \frac{\sin 2^n A}{2^n \sin A}$$

50. Express each of the following product as a sum or difference

$\sin 40^\circ \cos 30^\circ$

51. Express each of the following product as a sum or difference

$\cos 110^\circ \sin 55^\circ$

52. Express each of the following product as a sum or difference

$$\sin\frac{x}{2}\cos\frac{3x}{2}$$

53. Express each of the following sum or diofference as a product

$$\sin 50^\circ + \sin 20^\circ$$

54. Express each of the following sum or diofference as a product

$$\cos 6\theta + \cos 2\theta$$

55. Express each of the following sum or diofference as a product

$$\cos\frac{3x}{2} - \cos\frac{9x}{2}$$

> ▶ View Text Solution

56. Show that $\cos 36^\circ \cos 72^\circ \cos 108^\circ \cos 144^\circ = \dfrac{1}{16}$

> ▶ View Text Solution

57. Simplify $\dfrac{\sin 75^\circ - \sin 115^\circ}{\cos 75^\circ + \cos 15^\circ}$

> ▶ View Text Solution

58. Show that $\cos 10^\circ \cos 30^2 \cos 50^\circ \cos 70^\circ = \dfrac{3}{16}$

> ▶ View Text Solution

59. If $A + B + C = \pi$ prove that following

$$\cos A + \cos B + \cos C = 1 + 4\sin\left(\frac{A}{2}\right)\sin\left(\frac{B}{2}\right)\sin\left(\frac{C}{2}\right)$$

▶ View Text Solution

60. If $A + B + C = \pi$ prove that following

$$\sin\left(\frac{A}{2}\right)\sin\left(\frac{B}{2}\right)\sin\left(\frac{C}{2}\right) \leq \frac{1}{8}$$

▶ View Text Solution

61. If $A + B + C = \pi$ prove that following

$$1 < \cos A + \cos B + \cos C \leq \frac{3}{2}$$

▶ View Text Solution

62. Prove that

$$\sin\frac{A}{2} + \sin\frac{B}{2} + \sin\frac{C}{2} = 4\sin\left(\frac{\pi - A}{4}\right)\sin\left(\frac{\pi - B}{4}\right)\sin\left(\frac{\pi - C}{4}\right)$$

, if $A + B + C = \pi$

> ▶ View Text Solution

63. If $A + B + C = \pi$ prove that

$$\cos^2 A + \cos^2 B + \cos^2 C = 1 - 2\cos A \cos B \cos C.$$

> ▶ View Text Solution

64. Find the principal solution of $\sin\theta = \frac{1}{2}$

> ▶ View Text Solution

65. Find the principal solution of $\sin\theta = -\frac{\sqrt{3}}{2}$

66. Find the principal solution of $\cos ec\theta = -2$

67. Find the principal solution of $\cos\theta = \dfrac{1}{2}$

68. Find the general solution of $\sin\theta = -\dfrac{\sqrt{3}}{2}$

69. Find the general solutioin of

$\sec\theta = -2$

70. Find the general solutioin of

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

71. Solve $3 \cos^2 \theta = \sin^2 \theta$

72. Solve $\sin x + \sin 5x = \sin 3x$

73. Solve $\cos x + \sin x = \cos 2x + \sin 2x$

74. Solve the equation $\sin 9\theta = \sin \theta$

75. Solve $\tan 2x = -\cot\left(x + \dfrac{\pi}{3}\right)$

76. Solve $\sin x - 3\sin 2x + \sin 3x = \cos x - 3\cos 3x + \cos 3x$

77. Solve $\sin x + \cos x = 1 + \sin x \cos x$

78. Solve $2 \sin^2 x + \sin^2 2x = 2$

> ▶ View Text Solution

79. Prove that for any a and b

$-\sqrt{a^2 + b^2} \leq \sin \theta + b \cos \theta \leq \sqrt{a^2 + b^2}$
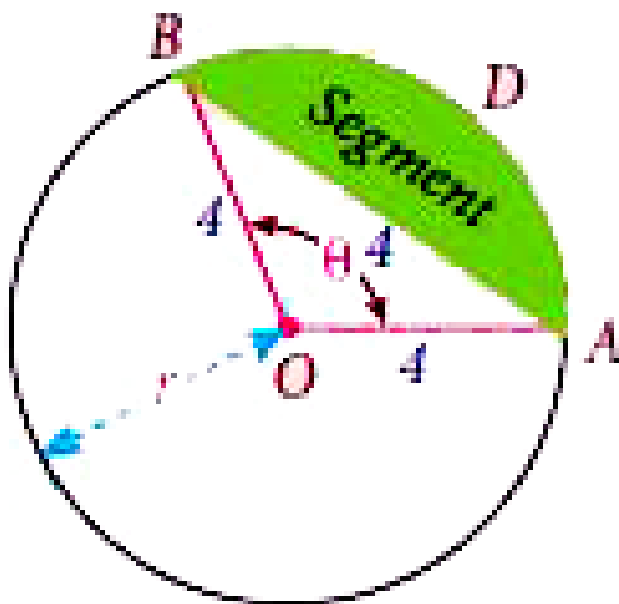
> ▶ View Text Solution

80. Solve $\sqrt{3} \sin \theta - \cos \theta = \sqrt{2}$

> ▶ View Text Solution

81. Solve $\sqrt{3} \tan^2 \theta + (\sqrt{3} - 1) \tan \theta - 1 = 0$

82. The Government plans to have a circular zoological park of diameter 8 km. A separate area in the form of a segment formed by a chord of length 4 km is to be alloted exclusively for a verterinary hospital in the park. Find the area of the segment to be alloted for the veterinary hospital.

83. In a $\triangle ABC$, prove that $b^2 \sin 2C + c^2 \sin 2B = 2bc \sin A$

84. In a ABC prove that $\sin\left(\dfrac{B-C}{2}\right) = \dfrac{b-c}{a}\cos\dfrac{A}{2}$

85. If the three angles in a triangle are in the ratio 1:2:3, then prove

that the corresponding sides are in the ratio $1:\sqrt{3}:2$

86. In a $\triangle ABC$ prove that

$(b+c)\cos A + (c+a)\cos B + (a+b)\cos C = a+b+c$

87. In a triangle ABC prove that $\dfrac{a^2 + b^2}{a^2 + c^2} = \dfrac{1 + \cos(A - B)\cos C}{1 + \cos(A - C)\cos B}$

> ► View Text Solution

88. Derive cosine formula using the law of sines in a ΔABC.

> ► View Text Solution

89. Using Heron's formula, show that the equilateral triangle has the maximum area for any fixed perimeter.

> ► View Text Solution

90. In a $\triangle ABC$, $a = 3$, $b = 5$ and c=7.

Find the values of cos A,cosB and cosC?

91. In $\triangle ABC$, $A = 30°$, $B = 60°$ and $c = 10$ Find a and b.

92. In a $\triangle ABC$ if $a = 2\sqrt{2}$, $b = 2\sqrt{3}$ and $C = 75°$ find the other

side and the angles.

93. Find the area of the triangle whose sides are 13 cm, 14 cm and 15

cm,

94. In any $\triangle ABC$, prove that $a\cos A + b\cos B + c\cos C = \dfrac{8\Delta^2}{abc}$

95. Suppose that there are two cell phone twoers within range of a cell phone. The two towers are located at 6 km apart along a straight highway, running east to west and the cell phone is north of the highway. The signal is 5 km from the first tower and $\sqrt{31}$ km from the second tower. Determine the position of the cell phone north and east of the first tower adn how far it is from the highway.
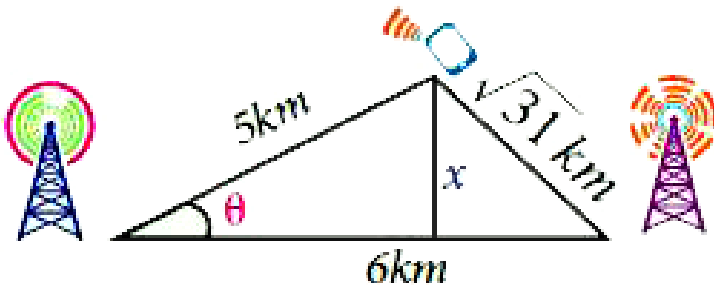
96. Suppose that a boat travels 10 km from the port towards east and then turns $60°$ to its left.If the boat travels further 8 km, how far from the port is the boat?
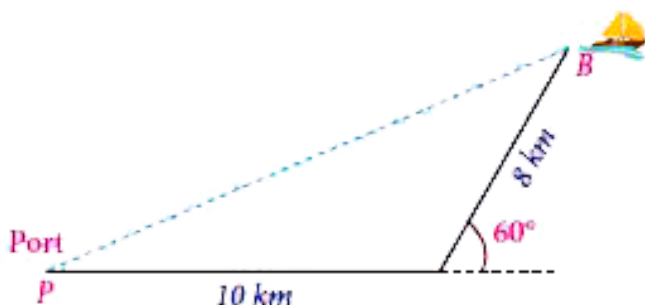
97. Suppose two radar stations located 100 km apart, each detect a fighter aircraft between them. The angle of elevation measured by the first station is $30°$, whereas the angle of elevation measred by the second station isd $45°$. Find the altitude of the aircraft at that

instant.
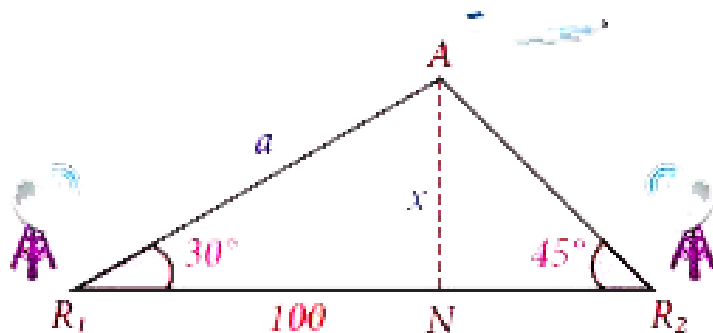
▶ View Text Solution

---

98. Find the principal value of $\sin^{-1}\left(\dfrac{\sqrt{3}}{2}\right)$

▶ View Text Solution

---

99. Find the principal value of $\cos ec^{-1}\left(\dfrac{2}{\sqrt{3}}\right)$

▶ View Text Solution

100. Find the principal value of $\tan^{-1}\left(\dfrac{-1}{\sqrt{3}}\right)$

▶ View Text Solution

Exercise 3 1

1. Identify the quadrant in which an angle of each given measure lies

25°

▶ View Text Solution

2. Identify the quadrant in which an angle of each given measure lies

825°

▶ View Text Solution

3. Identify the quadrant in which an angle of each given measure lies

-55°

4. Identify the quadrant in which an angle of each given measure lies

328°

5. Identify the quadrant in which an angle of each given measure lies

-230°

6. For each given angle, find a cotermina angle with measure of θ such that $0° \leq \theta < 360°$

$395°$

7. For each given angle, find a cotermina angle with measure of θ such that $0° \leq \theta < 360°$

$525°$

8. For each given angle, find a cotermina angle with measure of θ such that $0° \leq \theta < 360°$

$1150°$

9. For each given angle, find a cotermina angle with measure of θ such that $0° \leq \theta < 360°$

$-270°$

10. For each given angle, find a cotermina angle with measure of θ such that $0° \leq \theta < 360°$

$-450°$

11. If $\tan^2\theta = 1 - k^2$ show that $\sec\theta + \tan^3\theta\cos ec\theta = \left(2 - k^2\right)^{3/2}$. Also find the values o k for which this result holds.

> ▶ View Text Solution

12. If $\sec\theta + \tan\theta = p$, obtain the values of $\sec\theta$, $\tan\theta$ and $\sin\theta$ in terms of p.

> ▶ View Text Solution

13. Eliminate θ from the equation $a\sec\theta - c\tan\theta = b$ and $b\sec\theta + d\tan\theta = c$

> ▶ View Text Solution

1. Express each of the following angles in radian measure:

30°

▶ View Text Solution

2. Express each of the following angles in radian measure:

135°

▶ View Text Solution

3. Express each of the following angles in radian measure:

-205°

▶ View Text Solution

4. Express each of the following angles in radian measure:

$150°$

▶ View Text Solution

5. Express each of the following angles in radian measure:

$330°$

▶ View Text Solution

6. Find the degree measure corresponding to the following radian measures

$\dfrac{\pi}{3}$

▶ View Text Solution

7. Find the degree measure corresponding to the following radian measures

$$\frac{\pi}{9}$$

8. Find the degree measure corresponding to the following radian measures

$$\frac{2\pi}{5}$$

9. Find the degree measure corresponding to the following radian measures

$$\frac{7\pi}{3}$$

10. Find the degree measure corresponding to the following radian measures

$$\frac{10\pi}{9}$$

▶ View Text Solution

11. What must be the radius of a circular running path, arround which an athlete must run 5 times in order to describe 1km?

▶ View Text Solution

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

▶ View Text Solution

13. Find the degree measure of the angle subtended at thecentre of circle of radius d 100 cm by an arc of length 22 cm.

▶ View Text Solution

14. What is the length of the arc intercepted by a central angle of measure $41°$ in a circle of radius of ft?

▶ View Text Solution

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

▶ View Text Solution

16. The perimeter of a ceratain sector of a circle is equal to the length of the arc of a semi circle having the same radius. Express the angle of the sector in degrees, minutes and seconds.

▶ View Text Solution

17. An airplane propeller rotates 1000 times per minute. Find the number of degrees that a pont on the edge of the propeller will rotate in 1 second.

▶ View Text Solution

18. A train is moving on a circular track of 1500 m radius at the rate of 66 km/hr. What angle will it turn in 20 seconds?

▶ View Text Solution

19. A circular metallic plate of radius 8 cm and thickness 6 mm is melted and molded into a pie (a sector of the circle with thickness) of radius 16 cm and thickness 4 mm. Find the angle of the sector.

> ▶ View Text Solution

1. Find the values of

$\sin(480°)$

> ▶ View Text Solution

2. Find the values of

$\sin(-1110°)$

> ▶ View Text Solution

3. Find the values of

$\cos\left(300^\circ\right)$

▶ View Text Solution

4. Find the values of

$\tan\left(1050^\circ\right)$

▶ View Text Solution

5. Find the values of

$\cot\left(660^\circ\right)$

▶ View Text Solution

6. Find the values of

$$\tan\left(\frac{19\pi}{3}\right)$$

7. Find the values of

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

8. $\left(\frac{5}{7}, \frac{2\sqrt{6}}{7}\right)$ is a point on the terminal side of an angle θ in

standard positioni. Determine the trigonometric function values of

angle θ.

9. Find the values of other five trigonometric functions for the following:

$\cos \theta = -\dfrac{1}{2}$, θ lies in the III quadrant.

▶ View Text Solution

---

10. Find the values of other five trigonometric functions for the following:

$\cos \theta = \dfrac{2}{3}$, θ lies in the I quadrant

▶ View Text Solution

---

11. Find the values of other five trigonometric functions for the following:

$\sin \theta = -\dfrac{2}{3}$, θ lies in the IV quadrant

▶ View Text Solution

12. Find the values of other five trigonometric functions for the following:

$\tan \theta = -2$, θ lies in the II quadrant.

13. Find the values of other five trigonometric functions for the following:

$\sec \theta = \dfrac{13}{5}$, θ lies in the IV quadrant.

14. Find all the angles between $0°$ and $360°$ which satisfy the equation $\sin^2 \theta = \dfrac{3}{4}$

Exercise 3 4

1. If $\sin x = \dfrac{15}{17}$ and $\cos y = \dfrac{12}{13}, 0 < x < \dfrac{\pi}{2}, 0 < y < \dfrac{\pi}{2},$

find the value of $\sin(x + y)$

▶ View Text Solution

2. If $\sin x = \dfrac{15}{17}$ and $\cos y = \dfrac{12}{13}, 0 < x < \dfrac{\pi}{2}, 0 < y < \dfrac{\pi}{2},$

find the value of $\cos(x - y)$

▶ View Text Solution

3. If $\sin x = \dfrac{15}{17}$ and $\cos y = \dfrac{12}{13}, 0 < x < \dfrac{\pi}{2}, 0 < y < \dfrac{\pi}{2},$

find the value of $\tan(x + y)$

▶ View Text Solution

4. If $\sin A = \dfrac{3}{5}$ and $\cos B = \dfrac{9}{41}, 0 < A < \dfrac{\pi}{2}, 0 < B < \dfrac{\pi}{2}$

Find the values of $\sin(A + B)$

▶ View Text Solution

5. If $\sin A = \dfrac{3}{5}$ and $\cos B = \dfrac{9}{41}, 0 < A < \dfrac{\pi}{2}, 0 < B < \dfrac{\pi}{2}$

Find the values of $\cos(A - B)$

▶ View Text Solution

6. Find $\cos(x - y)$ given that $\cos x = -\dfrac{4}{5}$ with $\pi < x < \dfrac{3\pi}{2}$ and $\sin y = -\dfrac{24}{25}$ with $\pi < y < \dfrac{3\pi}{2}$

▶ View Text Solution

7. Find $\sin(x - y)$ given that $\sin x = \dfrac{8}{17}$ with $0 < x < \dfrac{\pi}{2}$ and $\cos y = -\dfrac{24}{25}$ with $\pi < y < \dfrac{3\pi}{2}$

▶ View Text Solution

8. Find the value of $\cos 105^\circ$

▶ View Text Solution

9. Find the quadratic equation whose roots are $\sin 15^\circ$ and $\cos 15^\circ$.

▶ View Text Solution

10. If $\tan x = \dfrac{n}{n+1}$ and $\tan y = \dfrac{1}{2n+1}$ find $\tan(x + y)$

▶ View Text Solution

11. Find the values of $\tan(\alpha + \beta)$ given that $\cot \alpha = \dfrac{1}{2}, \alpha \in \left(\pi, \dfrac{3\pi}{2}\right)$ and $\sec \beta = -\dfrac{5}{3}, \beta \in \left(\dfrac{\pi}{2}, \pi\right)$.

> ▶ View Text Solution

Exercise 3 5

1. Find the value of cos 2A, A lies in the first quadrant, when $\cos A = \dfrac{15}{17}$

> ▶ View Text Solution

2. Find the value of cos 2A, A lies in the first quadrant, when $\sin A = \dfrac{4}{5}$

> ▶ View Text Solution

3. Find the value of cos 2A, A lies in the first quadrant, when

$$\tan A = \frac{16}{63}$$

▶ View Text Solution

4. If θ is an acute angle, then find

$$\sin\left(\frac{\pi}{4} - \frac{\theta}{2}\right) \text{ when } \sin\theta = \frac{1}{25}$$

▶ View Text Solution

Exercise 3 6

1. Express each of the following as a sum or difference

$$\sin 35^2 \cos 28°$$

▶ View Text Solution

2. Express each of the following as a sum or difference

$\sin 4x \cos 2x$

▶ View Text Solution

3. Express each of the following as a sum or difference

$2 \sin 10\theta \cos 2\theta$

▶ View Text Solution

4. Express each of the following as a sum or difference

$\cos 5\theta \cos 2\theta$

▶ View Text Solution

5. Express each of the following as a sum or difference

$\sin 5\theta \sin 4\theta$

6. Express each of the following as a product

$\sin 75^\circ - \sin 35^\circ$

7. Express each of the following as a product

$\cos 65^\circ + \cos 15^\circ$

8. Express each of the following as a product

$$\sin 50^2 + \sin 40^\circ$$

▶ View Text Solution

9. Express each of the following as a product

$$\cos 35^\circ - \cos 75^\circ$$

▶ View Text Solution

Exercise 3 8

1. Find the principal solution and general solutions of the following:

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

▶ View Text Solution

2. Find the principal solution and general solutions of the following:

$\cot \theta = \sqrt{3}$

> ▶ View Text Solution

3. Find the principal solution and general solutions of the following:

$\tan \theta = -\dfrac{1}{\sqrt{3}}$

> ▶ View Text Solution

4. Solve the following equations for which solutions lies in the interval $0° \leq \theta < 360°$

$\sin^4 x = \sin^2 x$

> ▶ View Text Solution

5. Solve the following equations for which solutions lies in the interval $0° \leq \theta < 360°$

$2\cos^2 x + 1 = -3\cos x$

6. Solve the following equations for which solutions lies in the interval $0° \leq \theta < 360°$

$2\sin^2 x + 1 = 3\sin x$

7. Solve the following equations for which solutions lies in the interval $0° \leq \theta < 360°$

$\cos 2 = 1 - 3\sin x$

8. Solve the following equations:

$$\sin 5x - \sin x = \cos 3x$$

9. Solve the following equations:

$$2\cos^2\theta + 3\sin\theta - 3 = 0$$

10. Solve the following equations:

$$\cos\theta + \cos 3\theta = 2\cos 2\theta$$

11. Solve the following equations:

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

12. Solve the following equations:

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

13. Solve the following equations:

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

14. Solve the following equations:

$$\sin \theta + \sqrt{3} \cos \theta = 1$$

▶ View Text Solution

15. Solve the following equations:

$$\cot \theta + \cos ec\theta = \sqrt{3}$$

▶ View Text Solution

16. Solve the following equations:

$$\tan \theta + \tan\left(\theta + \frac{\pi}{3}\right) + \tan\left(\theta + \frac{2\pi}{3}\right) = \sqrt{3}$$

▶ View Text Solution

17. Solve the following equations:

$$\cos 2\theta = \frac{\sqrt{5} + 1}{4}$$

> ► View Text Solution

18. Solve the following equations:

$$2 \cos^2 x - 7c \otimes\ + 3 = 0$$

> ► View Text Solution

Exercise 3 9

1. The angles of a triangle ABC, are in Arithmetic Progression and if $b : c = \sqrt{3} : \sqrt{2}$ find $\angle A$

> ► View Text Solution

2. An Engineer has develop a triangular shaped park with a perimeter 120 m in a village. The park to be developed must be of maximum area. Find out the dimensions of the park.

> ▶ **View Text Solution**

3. A rope of length 12 m is given. Find the largest area of the triangle formed by this rope and find the dimensions of the triangle so formed.

> ▶ **View Text Solution**

Exercise 3 10

1. Determine whether the following measurements produce one triangle, two triangles or no triangle,

$\angle B = 88°$, $a = 23$, $b = 2$. Solve if solution exists.

2. In a $\triangle ABC$ if $a = \sqrt{3} - 1$, $b = \sqrt{3} + 1$ and $C = 60°$, find the other side and other two angles.

3. Two soldiers A and B in two different underground bunkers on a straight road, sopt an intruder at the top of a hill. The angle of elevation of the intruder from A and B to the ground level in the eastern direction are $30°$ and $45°$ respetively. If A and B stand 5 km apart, find the distance of the intruder from B.

4. A researcher wants to determine the width of a pond from east to west, which cannot be done by actual measurement. From a point P, he finds the distance to the eastern most point of the pond to be 8 km , while the distance to the western most point from P to be 6 km. If the angle between the two lines of sight is $60°$, find the width of the pond.

5. Two Navy helicopters A and B are flying over the Bay of Bengal at same altitude from the sea level to search a missing boat. Pilots of both the helicopters sight the boat at the same time while they are apart 10 km from each other. If the distance of the boat from A is 6 km and if he line segment AB subtends $60°$ at the boat, find the distance of the boat from B.

6. A straight tunnel is to be through a mountain. A surveyor observes the two extremities A and B of the tunnel to be built from a point P in front of the mountain. If AP=3km, BP=5km and $\angle APB = 120°$, then find the length of the tunnel to be built.

▶ View Text Solution

7. A farmer wants to purchase a triangular shaped land with sides 120 feet and 60 feet and the angle included between these two sides is $60°$. If the land costs Rs. 500 per sq. ft. find the amount he needed to purchase the land. Also find the perimeter of the land.

▶ View Text Solution

8. A fighter jet has to his a small target by flying a horizontal distance. When the target is sighted, the pilot measures the angle

of depression to be $30°$. If after 100 km, the target has an angle of depression of $45°$, how far is the target from the fighter jet at tha instant?

9. A plane is 1 km from onee landmark and 2 km from another. From the planes point of view the land between them subtends and angle of $45°$. How far apart are the landmarks?

10. A man starts his morning walk at a point A reaches two points B and C and finally back to A such that $\angle A = 60°$ and $\angle B = 45°$, $AC = 4km$ in the $\triangle ABC$. Find the total distance he covered during his morning walk.

11. Two vehicles leave the same place P at the same time moving along two different roads. One vehicle moves at an average speed to 60 km/hr and the other vehicle moves at an average speed of 80 km/hr. After half an hour the vehicle reach the destinations. A and B. If AB subtends $60°$ at the initial point P then find AB.

▶ View Text Solution

Exercise 3 11

1. Find the principal values of
$\sin^{-1}\dfrac{1}{\sqrt{2}}$

▶ View Text Solution

2. Find the principal values of

$$\cos^{-1}\frac{\sqrt{3}}{2}$$

▶ View Text Solution

3. Find the principal values of

$$\cos ec^{-1}(-1)$$

▶ View Text Solution

4. Find the principal values of

$$\sec^{-1}(-\sqrt{2})$$

▶ View Text Solution

5. Find the principal values of

$$\tan^{-1}\left(\sqrt{3}\right)$$

Exercise 3 12

1. $\dfrac{1}{\cos 80^\circ} - \dfrac{\sqrt{3}}{\sin 80^\circ} =$

   A. $\sqrt{2}$

   B. $\sqrt{3}$

   C. 2

   D. 4

Answer: D

2. If $\cos 28° + \sin 28° = k^3$ then $\cos 17°$ is equal to

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

B. $-\dfrac{k^3}{\sqrt{2}}$

C. $\pm\dfrac{k^3}{\sqrt{2}}$

D. $-\dfrac{k^3}{\sqrt{3}}$

Answer: A

▶ View Text Solution

3. The maximum value of $4\sin^2 x + 3\cos^2 x + \sin\dfrac{x}{2} + \cos\dfrac{x}{2}$ is

A. $4 + \sqrt{2}$

B. $3 + \sqrt{2}$

C. 9

D. 4

Answer: A

▶ View Text Solution

---

4. $\left(1 + \cos\dfrac{\pi}{8}\right)\left(1 + \cos\dfrac{3\pi}{8}\right)\left(1 + \cos\dfrac{5\pi}{8}\right)\left(1 + \cos\dfrac{7\pi}{8}\right) =$

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

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

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

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

Answer: A

▶ View Text Solution

5. If $\pi < 2\theta < \dfrac{3\pi}{2}$ then $\sqrt{2 + \sqrt{2 + 2\theta}}$ equals to

A. $-2\cos\theta$

B. $-2\sin\theta$

C. $2\cos\theta$

D. $2\sin\theta$

Answer: D

▶ View Text Solution

6. If $\tan 40° = \lambda$ then $\dfrac{\tan 140° - \tan 130°}{1 + \tan 140° \tan 130°}$

A. $\dfrac{1 - \lambda^2}{\lambda}$

B. $\dfrac{1 + \lambda^2}{\lambda}$

C. $\dfrac{1 + \lambda^2}{2\lambda}$

D. $\dfrac{1 - \lambda^2}{2\lambda}$

Answer: D

▶ **View Text Solution**

7. $\cos 1^\circ + \cos 2^\circ + \cos 3^\circ + \ldots\ldots\ldots\ldots + \cos 179^\circ =$

A. 0

B. 1

C. -1

D. 89

Answer: A

▶ **View Text Solution**

8. Let $f_x(x) = \dfrac{1}{k}\left[\sin^k x + \cos^k x\right]$ where $x \in R$ and $k \geq 1$. Then $f_4(x) - f_6(x) =$

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

B. $\dfrac{1}{12}$

C. $\dfrac{1}{6}$

D. $\dfrac{1}{3}$

Answer: B

▶ View Text Solution

9. Which of the following is not true?

A. $\sin\theta = -\dfrac{3}{4}$

B. $\cos\theta = -1$

C. $\tan\theta = 25$

D. $\sec\theta = \dfrac{1}{4}$

Answer: D

▶ View Text Solution

---

10. $\cos 2\theta \cos 2\phi + \sin^2(\theta - \phi) - \sin^2(\theta + \phi)$ is equal to

A. $\sin 2(\theta + \phi)$

B. $\cos 2(\theta + \phi)$

C. $\sin 2(\theta - \phi)$

D. $\cos 2(\theta - \phi)$

Answer: B

▶ View Text Solution

11. $\dfrac{\sin(A - B)}{\cos A \cos B} + \dfrac{\sin(B - C)}{\cos BC} + \dfrac{\sin(C - A)}{\cos C \cos A}$ is

A. $\sin A + \sin B + \sin C$

B. 1

C. 0

D. $\cos A + \cos B + \cos C$

Answer: C

12. If $\cos p\theta + \cos q\theta = 0$ and if $p \neq q$, then θ is equal to (n is ay integer)

A. $\dfrac{\pi(\in + 1)}{p - q}$

B. $\left(\pi \dfrac{2n + 1}{p \pm q} \right.$

C. $\left(\pi \dfrac{n \pm 1}{p \pm q}\right.$

D. $\dfrac{\pi(n + 2)}{p + q}$

Answer: B

> ▶ View Text Solution

---

13. If $\tan\alpha$ and $\tan\beta$ are the roots of $x^2 + ax + b = 0$ then $\dfrac{\sin(\alpha + \beta)}{\sin\alpha \sin\beta}$ is equal to

A. $\dfrac{b}{a}$

B. $\dfrac{a}{b}$

C. $-\dfrac{a}{b}$

D. $-\dfrac{b}{a}$

Answer: C

> ▶ View Text Solution

14. In a triangle ABC $\sin^2 A + \sin^2 B + \sin^2 B + \sin^2 C = 2$, then the triangle is

    A. equilateral triangle

    B. isosceles triangle

    C. right triangle

    D. scalene triangle.

Answer: C

▶ View Text Solution

---

15. If $f(\theta) = |\sin \theta| + |\cos \theta|, \theta \in R$ then $f(\theta)$ is the interval

    A. $[0, 2]$

B. $\left[1, \sqrt{2}\right]$

C. $[1, 2]$

D. $[0, 1]$

Answer: B

▶ View Text Solution

16. $\dfrac{\cos 6x + 6\cos 4x + 15\cos 2x + 10}{\cos 5x + 5\cos 3x + 10\cos x}$ is equal to

A. $\cos 2x$

B. $\cos x$

C. $\cos 3x$

D. $2\cos x$

Answer: D

▶ View Text Solution

17. The triangle of maximum area with constant perimeter 12 m

    A. is an equilateral triangle with side 4m

    B. is an isosceles triangle with sides 2m, 5m, 5m

    C. is a triangle with sides 3m, 4m, 5m

    D. does not exist

Answer: A

> ▶ **View Text Solution**

18. A wheel is spinnig at 2 radians/second. How many seconds will it take to make 10 complete rotations?

    A. 10π seconds

B. 20π seconds

C. 5π seconds

D. 15π seconds

Answer: A

▶ View Text Solution

19. If $\sin\alpha + \cos\alpha = b$ then $\sin 2\alpha$ is equal to

A. $b^2 - 1$, if $b \leq \sqrt{2}$

B. $b^2 - 1$, if $b > \sqrt{2}$

C. $b^2 1$, if $b \geq 1$

D. $b^2 - 1$ if $b \geq \sqrt{2}$

Answer: A

▶ View Text Solution

20. In a $\triangle ABC$ if

(i) $\sin\dfrac{A}{2}\sin\dfrac{B}{2}\sin\dfrac{C}{2} > 0$

(ii) $\sin A \sin B \sin C > 0$ then

    A. both I and ii are true

    B. only I is true

    C. only ii is true

    D. neither I nor ii is true.

Answer: A

▶ View Text Solution