MATHS

BOOKS - SELINA MATHS (ENGLISH)

TRIGONOMETRICAL IDENTITIES

Exercise 21 A

1. Prove the following identities :

$$\frac{\sec A - 1}{\sec A + 1} = \frac{1 - \cos A}{1 + \cos A}$$

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2. Prove the following identities :

$$\frac{1 + \sin A}{1 - \sin A} = \frac{\cos ecA + 1}{\cos ecA - 1}$$

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3. Prove the following identities :

$$\frac{1}{\tan A + \cot A} = \cos ec A \sin A$$

4. Prove the following identities :

$$\tan A - \cot A = \frac{1 - 2\cos^2 A}{\sin A \cos A}$$

5. Prove the following identities :

$$\sin^4 A - \cos^4 A = 2\sin^2 A - 1$$

6. Prove the following identities :

$$(1 - \tan A)^2 + (1 + \tan A)^2 = 2 \sec^2 A$$

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7. Prove the following identities :

$$\cos ec^4 A - \cos ec^2 A = \cot^4 A + \cot^2 A$$

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8. Prove the following identities :

$$\sec A(1 - \sin A)(\sec A + \tan A) = 1$$

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9. Prove the following identities :

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

10. Prove that

$$\sec^2 A + \csc^2 A = \sec^2 A \csc^2 A.$$

11. Prove the following identities :

$$\frac{(1 + \tan^2 A)\cot A}{\cos ec^2 A} = \tan A$$

12. Prove the following identities :

$$\tan^2 A - \sin^2 A = \tan^2 A. \sin^2 A$$

13. Prove the following identities :

$$\cot^2 A - \cos^2 A = \cos^2 A. \cot^2 A$$

14. Prove the following identities :

$$(\cos ecA + \sin A)(\cos ecA - \sin A) = \cot^2 A + \cos^2 A$$

15. Prove the following identities :

$$(\sec A - \cos A)(\sec A + \cos A) = \sin^2 A + \tan^2 A$$

16. Prove the following identities :

$$(\cos A + \sin A)^2 + (\cos A - \sin A)^2 = 2$$

17. Prove the following identities :

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

18. Prove the following identities :

$$\frac{1}{\sec A + \tan A} = \sec A - \tan A$$

19. Prove the following identities :

$$\cos ecA + \cot A = \frac{1}{\cos ecA - \cot A}$$

20. Prove the following identities :

$$\frac{\sec A - \tan A}{\sec A + \tan A} = 1 - 2\sec A \tan A + 2\tan^2 A$$

21. Prove the following identities:

$$(\sin \theta + \cos ec\theta)^2 + (\cos \theta + \sec \theta)^2 = 7 + \tan^2 \theta + \cot^2 \theta$$

22. Prove the following identities :

$$\sec^2 A. \cos ec^2 A = \tan^2 A + \cot^2 A + 2$$

23. Prove the following identities :

$$\frac{1}{1 + \cos A} + \frac{1}{1 - \cos A} = 2\cos ec^2 A$$

24. Prove the following identities :

$$\frac{1}{1 - \sin A} + \frac{1}{1 + \sin A} = 2 \sec^2 A$$

25. Prove the following identities :

$$\frac{\cos ecA}{\cos ecA - 1} + \frac{\cos ecA}{\cos ecA + 1} = 2 \sec^2 A$$

26. Prove the following identities :

$$\frac{\sec A}{\sec A + 1} + \frac{\sec A}{\sec A - 1} = 2 \cos ec^2 A$$

27. Prove the following identities :

$$\frac{1 + \cos A}{1 - \cos A} + \frac{\tan^2 A}{(\sec A - 1)^2}$$

28. Prove the following identities :

$$\frac{\cot^2 A}{(\cos ecA + 1)^2} + \frac{1 - \sin A}{1 + \sin A}$$

29. Prove the following identities :

$$\frac{1 + \sin A}{\cos A} + \frac{\cos A}{1 + \sin A} = 2 \sec A$$

30. Prove the following identities :

$$\frac{1 - \sin A}{1 + \sin A} = (\sec A - \tan A)^2$$

31. Prove the following identities :

$$(\cot A - \cos ecA)^2 = \frac{1 - \cos A}{1 + \cos A}$$

32. Prove the following identities :

$$\frac{\cos ecA - 1}{\cos ecA + 1} = \left(\frac{\cos A}{1 + \sin A}\right)^2$$

33. Prove the following identities :

$$\tan^2 A - \tan^2 B = \frac{\sin^2 A - \sin^2 B}{\cos^2 A . \cos^2 B}$$

34. Prove the following identities :

$$\frac{\sin 0 - 2\sin^3 0}{2\cos^3 0 - \cos 0} = \tan 0$$

35. Prove the following identities :

$$\frac{\sin A}{1 + \cos A} = \cos ecA - \cot A$$

36. Prove the following identities :

$$\frac{\cos A}{1 - \sin A} = \sec A + \tan A$$

37. Prove the following identities :

$$\frac{\sin A \tan A}{1 - \cos A} = 1 + \sec A$$

38. Prove the following identities :

$$(1 + \cot A - \cos ecA)(1 + \tan A + \sec A) = 2$$

39. Prove the following identities :

$$\sqrt{\frac{1 + \sin A}{1 - \sin A}} = \sec A + \tan A$$

40. Prove the following identities :

$$\sqrt{\frac{1 - \cos A}{1 + \cos A}} = \cos ecA - \cot A$$

41. Prove the following identities :

$$\sqrt{\frac{1 - \cos A}{1 + \cos A}} = \frac{\sin A}{1 + \cos A}$$

42. Prove the following identities :

$$\sqrt{\frac{1 - \sin A}{1 + \sin A}} = \frac{\cos A}{1 + \sin A}$$

43. Prove the following identities :

$$1 - \frac{\cos^2 A}{1 + \sin A} = \sin A$$

44. Prove the following identities :

$$\frac{1}{\sin A + \cos A} + \frac{1}{\sin A - \cos A} = \frac{2\sin A}{1 - 2\cos^2 A}$$

45. Prove the following identities :

$$\frac{\sin A + \cos A}{\sin A - \cos A} + \frac{\sin A - \cos A}{\sin A + \cos A} = \frac{2}{2\sin^2 A - 1}$$

46. Prove the following identities :

$$\frac{\cot A + \cos ecA - 1}{\cot A - \cos ecA + 1} = \frac{1 + \cos A}{\sin A}$$

47. Prove the following identities :

$$\frac{1 + \sin A}{\cos ecA - \cot A} - \frac{1 - \sin A}{\cos ecA + \cot A} = 2(1 + \cot A)$$

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48. Prove the following identities :

$$\frac{\cos 0 \cot 0}{1 + \sin 0} = \cos ec0 - 1$$

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Exercise 21 B

1. Prove that :

$$\frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A} = \sin A + \cos A$$

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2. Prove that :

$$\frac{\cos^3 A + \sin^3 A}{\cos A + \sin A} + \frac{\cos^3 A - \sin^3 A}{\cos A - \sin A} = 2$$

3. Prove that :

$$\frac{\tan A}{1 - \cot A} + \frac{\cot A}{1 - \tan A} = \sec A \cos ec A + 1$$

4. Prove that :

$$\left(\tan A + \frac{1}{\cos A}\right)^2 + \left(\tan A - \frac{1}{\cos A}\right)^2 = 2\left(\frac{1 + \sin^2 A}{1 - \sin^2 A}\right)$$

5. Prove that :

$$2\sin^2 A + \cos^4 A = 1 + \sin^4 A$$

6. Prove that :

$$\frac{\sin A - \sin B}{\cos A + \cos B} + \frac{\cos A - \cos B}{\sin A + \sin B} = 0$$

7. Prove that

$$(\operatorname{cosec} A - \sin A)(\sec A - \cos A) = \frac{1}{(\tan A + \cot A)}.$$

8. Prove the identity:

$$(1 + \tan A \tan B)^2 + (\tan A - \tan B)^2 = \sec^2 A \sec^2 B$$

9. Prove that :

$$\frac{1}{\cos A + \sin A - 1} + \frac{1}{\cos A + \sin A + 1} = \cos ecA + \sec A$$

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10. If

$$x \cos A + y \sin A = m \ \text{ and } \ x \sin A - y \cos A = n,$$

then prove that :

$$x^2 + y^2 = m^2 + n^2$$

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11. If

$$m = a \sec A + b \tan A \ \text{ and } \ n = a \tan A + b \sec A,$$

then prove that :

$$m^2 - n^2 = a^2 - b^2$$

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12. If

$x = r \sin A \cos B, \, y = r \sin A \sin B \text{ and } z = r \cos A,$

then prove that :

$x^2 + y^2 + z^2 = r^2$

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13. If

$\sin A + \cos A = p \text{ and } \sec A + \cos ecA = q,$

then prove that :

$q\left(p^2 - 1\right) = 2p$

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14. If

$x = r \cos A \cos B, \, y = r \cos A \sin B \text{ and } z = r \sin A,$

show that :

$$x^2 + y^2 + z^2 = r^2$$

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15. If $\dfrac{\cos \alpha}{\cos \beta} = m$ and $\dfrac{\cos \alpha}{\sin \beta} = n$ show that $\left(m^2 + n^2\right)\cos^2 \beta = n^2$

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Exercise 21 C

1. Show that:

$$\tan 10^\circ \tan 15^\circ \tan 75^\circ \tan 80^\circ = 1$$

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2. Show that:

$$\sin 42° \sec 48° + \cos 42° \cos ec 48° = 2$$

3. Show that :

$$\frac{\sin 26°}{\sec 64°} + \frac{\cos 26°}{\cos ec 64°} = 1$$

4. Express the following in terms of angles between $0°$ and $45°$

$$\sin 59° + \tan 63°$$

5. Express the following in terms of angles between $0°$ and $45°$

$$\cos ec 68° + \cot 72°$$

6. Express the following in terms of angles between $0°$ and $45°$

$\cos 74° + \sec 67°$

7. Prove that : $\dfrac{\sin A}{\sin(90° - A)} + \dfrac{\cos A}{\cos(90° - A)} = \sec A \cos ecA.$

8. Show that :

$\sin A \cos A - \dfrac{\sin A \cos(90° - A)\cos A}{\sec(90° - A)} - \dfrac{\cos A \sin(90° - A)\sin A}{\cos ec(90° - A)} = 0$

9. For triangle ABC, show that :

(i) $\sin\dfrac{A+B}{2} = \cos\dfrac{C}{2}$

(ii) $\tan\dfrac{B+C}{2} = \cot\dfrac{A}{2}$

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10. For triangle ABC, show that

$\tan\dfrac{B+C}{2} = \cot\dfrac{A}{2}$

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11. Evaluate :

$3\dfrac{\sin 72^\circ}{\cos 18^\circ} - \dfrac{\sec 32^\circ}{\cos ec58^\circ}$

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12. Evaluate :

$3\cos 80° \cos ec10° + 2\sin 59° \sec 31°$

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13. Evaluate :

$\dfrac{\sin 80°}{\cos 10°} + \sin 59° \sec 31°$

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14. Evaluate :

$\tan(55° - A) - \cot(35° + A)$

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15. Evaluate :

$\cos ec(65° + A) - \sec(25° - A)$

16. Evaluate :

$$2\frac{\tan 57^\circ}{\cot 33^\circ} - \frac{\cot 70^\circ}{\tan 20^\circ} - \sqrt{2}\cos 45^\circ$$

17. Evaluate :

$$\frac{\cot^2 41^\circ}{\tan^2 49^\circ} - 2\frac{\sin^2 75^\circ}{\cos^2 15^\circ}$$

18. Evaluate :

$$\frac{\cos 70^\circ}{\sin 20^\circ} + \frac{\cos 59^\circ}{\sin 31^\circ} - 8\sin^2 30^\circ$$

19. Evaluate :

$$14\sin 30° + 6\cos 60° - 5\tan 45°$$

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20. A triangle ABC is right angled at B, find the value of

$$\frac{\sec A . \cos ecC - \tan A . \cot C}{\sin B}$$

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21. Find (in each case, given below) the value of x, if :

$$\sin x = \sin 60° \cos 30° - \cos 60° \sin 30°$$

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22. Find (in each case, given below) the value of x, if :

$$\sin x = \sin 60° \cos 30° + \cos 60° \sin 30°$$

23. Find (in each case, given below) the value of x, if :

$$\cos x = \cos 60° \cos 30° - \sin 60° \sin 30°$$

24. Find (in each case, given below) the value of x, if :

$$\tan x = \frac{\tan 60° - \tan 30°}{1 + \tan 60° \tan 30°}$$

25. Find (in each case, given below) the value of x, if :

$$\sin 2x = 2\sin 45° \cos 45°$$

26. Find (in each case, given below) the value of x, if :

$$\sin 3x = 2\sin 30^\circ \cos 30^\circ$$

27. Find the value of x in the following :

cos2x=cos60cos30 + sin60sin30

28. In each case, given below, find the value of angle A, where

$$0^\circ \le A \le 90^\circ$$

$$\sin(90^\circ - 3A). \cos ec42^\circ = 1$$

29. In each case, given below, find the value of angle A, where

$$\cos(90^\circ - A).\sec 77^\circ = 1$$

30. Prove that :

$$\frac{\cos(90^\circ - 0)\cos 0}{\cot 0} = 1 - \cos^2 0$$

31. Prove that :

$$\frac{\sin\theta.\sin(90^\circ - \theta)}{\cot(90^\circ - \theta)} = 1 - \sin^2\theta$$

32. Evaluate :

$$\frac{\sin 35^\circ \cos 55^\circ + \cos 35^\circ \sin 55^\circ}{\cos ec^2 10^\circ - \tan^2 80^\circ}$$

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33. Without using trigonometric tables, evaluate.

$$\sin^2 34^\circ + \sin^2 56^\circ + 2 \ \tan 18^\circ \tan 72^\circ - \cot^2 30^\circ$$

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34. Without using trigonometrical tables, evaluate.

$$\csc^2 57^\circ \ \_ \ \tan^2 33^\circ + \cos 44^\circ \csc 46^\circ - \sqrt{2} \ \cos 45^\circ - \tan^2 60^\circ$$

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Exercise 21 D

1. Use tables to find sine of :

$21°$

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2. Use tables to find sine of :

$34° 42$

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3. Use tables to find sine of :

$47° 32$

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4. Use tables to find sine of :

$62° 57$

5. Use tables to find sine of :

$10° 20 + 20° 45$

6. Use tables to find cosine of :

$2° 4$

7. Use tables to find cosine of :

$8° 12$

8. Use tables to find cosine of :

$26^\circ 32$

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9. Use tables to find cosine of :

$65^\circ 41$

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10. Use tables to find cosine of :

$9^\circ 23 + 15^\circ 54$

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11. Use trigonometrical tables to find tangent of :

37°

12. Use trigonometrical tables to find tangent of :

$42° 18$

13. Use trigonometrical tables to find tangent of :

$17° 27$

14. Use tables to find the acute angle 0, if the value of sin 0 is : 0.4848

15. Use tables to find the acute angle 0, if the value of sin 0 is : 0.3827

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16. Use tables to find the acute angle 0, if the value of sin 0 is : 0.6525

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17. Use tables to find the acute angle 0, if the value of cos 0 is : 0.9848

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18. Use tables to find the acute angle 0, if the value of cos 0 is : 0.9848

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19. Use tables to find the acute angle 0, if the value of cos 0 is : 0.9848

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20. Use tables to find the acute angle 0, if the value of tan 0 is : 0.2419

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21. Use tables to find the acute angle 0, if the value of tan 0 is : 0.4741

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22. Use tables to find the acute angle 0, if the value of tan 0 is : 0.7391

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Exercise 21 E

1. Prove the following identities :

$$\frac{1}{\cos A + \sin A} + \frac{1}{\cos A - \sin A} = \frac{2\cos A}{2\cos^2 A - 1}$$

2. Prove the following identities :

$$\cos ecA - \cot A = \frac{\sin A}{1 + \cos A}$$

3. Prove the following identities :

$$1 - \frac{\sin^2 A}{1 + \cos A} = \cos A$$

4. Prove the following identities :

$$\frac{1 - \cos A}{\sin A} + \frac{\sin A}{1 - \cos A} = 2 \cos ecA$$

5. Prove the following identities :

$$\frac{\cot A}{1 - \tan A} + \frac{\tan A}{1 - \cot A} = 1 + \tan A + \cot A$$

6. Prove the following identities :

$$\frac{\cos A}{1 + \sin A} + \tan A = \sec A$$

7. Prove the following identities :

$$\frac{\sin A}{1 - \cos A} - \cot A = \cos ecA$$

8. Prove the following identities :

$$\frac{\sin A - \cos A + 1}{\sin A + \cos A - 1} = \frac{\cos A}{1 - \sin A}$$

9. Prove the following identities :

$$\sqrt{\frac{1 + \sin A}{1 - \sin A}} = \frac{\cos A}{1 - \sin A}$$

10. Prove the following identities :

$$\sqrt{\frac{1 - \cos A}{1 + \cos A}} = \frac{\sin A}{1 + \cos A}$$

11. Prove the following identities :

$$\frac{1 + (\sec A - \tan A)^2}{\cos ecA(\sec A - \tan A)} = 2\tan A$$

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12. Prove the following identities :

$$\frac{(\cos ecA - \cot A)^2 + 1}{\sec A(\cos ecA - \cot A)} = 2\cot A$$

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13. Prove the following identities :

$$\cot^2 A\left(\frac{\sec A - 1}{1 + \sin A}\right) + \sec^2 A\left(\frac{\sin A - 1}{1 + \sec A}\right) = 0$$

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14. Prove the following identities :

$$\frac{\left(1 - 2\sin^2 A\right)^2}{\cos^4 A - \sin^4 A} = 2\cos^2 A - 1$$

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15. Prove the following identities :

$$\sec^4 A\left(1 - \sin^4 A\right) - 2\tan^2 A = 1$$

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16. Prove the following identities :

$$\cos ec^4 A\left(1 - \cos^4 A\right) - 2\cot^2 A = 1$$

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17. Prove the following identities :

$$(1 + \cot A - \cos ec A)(1 + \tan A + \sec A) = 2$$

18. If

$$\sin A + \cos A = p \text{ and } \sec A + \cos ec A = q,$$

then prove that :

$$q(p^2 - 1) = 2p$$

19. If

$$x = a \cos \theta \text{ and } y = b \cot \theta,$$

show that :
$$\frac{a^2}{x^2} - \frac{b^2}{y^2} = 1$$

20. If

$$\sec A + \tan A = p,$$

show that :

$$\sin A = \frac{p^2 - 1}{p^2 + 1}$$

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21. If

$$\tan A = n \tan B \ \text{and} \ \sin A = m \sin B,$$

prove that :

$$\cos^2 A = \frac{m^2 - 1}{n^2 - 1}$$

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22. if

$$2 \sin A - 1 = 0,$$

show that :

$$\sin 3A = 3\sin A - 4\sin^3 A$$

23. If

$$4\cos^2 A - 3 = 0,$$

show that :

$$\cos 3A = 4\cos^3 A - 3\cos A$$

24. Evaluate without using trigonometric tables.

$$2\left(\frac{\tan 35^\circ}{\cot 55^\circ}\right)^2 + \left(\frac{\cot 55^\circ}{\tan 35^\circ}\right)^2 - 3\left(\frac{\sec 40^\circ}{\operatorname{cosec} 50^\circ}\right)$$

25. Evaluate :

$$\sec 26^\circ \sin 64^\circ + \frac{\cos ec33^\circ}{\sec 57^\circ}$$

26. Evaluate

$$\frac{5\sin 66^\circ}{\cos 24^\circ} - \frac{2\cot 85^\circ}{\tan 5^\circ}$$

27. Evaluate

$$\cos 40^\circ \cos ec50^\circ + \sin 50^\circ \sec 40^\circ$$

28. Evaluate

$$\sin 27^\circ \sin 63^\circ - \cos 63^\circ \cos 27^\circ$$

29. Evaluate :

$$3\frac{\sin 72^\circ}{\cos 18^\circ} - \frac{\sec 32^\circ}{\cos ec58^\circ}$$

30. Evaluate

$$3\cos 80^\circ \cos ec10^\circ + 2\cos 59^\circ \cos ec31^\circ$$

31. Evaluate :

$$\frac{\cos 75^\circ}{\sin 15^\circ} + \frac{\sin 12^\circ}{\cos 78^\circ} - \frac{\cos 18^\circ}{\sin 72^\circ}$$

32. Prove that :

$$\tan(55° + x) = \cot(35° - x)$$

33. Prove that :

$$\sec(70° - 0) = \cos ec(20° + 0)$$

34. Prove that :

$$\sin(28° + A) = \cos(62° - A)$$

35. Prove that :

$$\frac{1}{1 + \cos(90° - A)} + \frac{1}{1 - \cos(90° - A)} = 2\cos ec^2(90° - A)$$

36. Prove that :

$$\frac{1}{1 + \sin(90^\circ - A)} + \frac{1}{1 - \sin(90^\circ - A)} = 2\sec^2(90^\circ - A)$$

37. If A and B are complementary angles, prove that :

$$\cot B + \cos B = \sec A \cos B(1 + \sin B)$$

38. If A and B are complementary angles, prove that :

$$\cot A \cot B - \sin A \cos B - \cos A \sin B = 0$$

39. If A and B are complementary angles, prove that :

$$\cos ec^2 A + \cos ec^2 B = \cos ec^2 A \cos ec^2 B$$

40. If A and B are complementary angles, prove that :

$$\frac{\sin A + \sin B}{\sin A - \sin B} + \frac{\cos B - \cos A}{\cos B + \cos A} = \frac{2}{2\sin^2 A - 1}$$

41. Prove that :

$$\frac{1}{\sin A - \cos A} - \frac{1}{\sin A + \cos A} = \frac{2\cos A}{2\sin^2 A - 1}$$

42. Prove that :

$$\frac{\cot^2 A}{\cos ec A - 1} - 1 = \cos ec A$$

43. Prove that :

$$\frac{\cos A}{1 + \sin A} = \sec A - \tan A$$

44. Prove that :

$$\cos A(1 + \cot A) + \sin A(1 + \tan A) = \sec A + \cos ec A$$

45. Prove that :

$$(\sin A - \cos A)(1 + \tan A + \cot A) = \frac{\sec A}{\cos ec^2 A} - \frac{\cos ecA}{\sec^2 A}$$

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46. Prove that :

$$\sqrt{\sec^2 A + \cos ec^2 A} = \tan A + \cot A$$

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47. Prove that :

$$(\sin A + \cos A)(\sec A + \cos ecA) = 2 + \sec A \cos ecA$$

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48. Prove that :

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

49. Prove that :

$$\cot^2 A - \cot^2 B = \frac{\cos^2 A - \cos^2 B}{\sin^2 A \sin^2 B} = \cos ec^2 A - \cos ec^2 B$$

50. Prove that :

$$\frac{\cot A - 1}{2 - \sec^2 A} = \frac{\cot A}{1 + \tan A}$$

51. If

$$4\cos^2 A - 3 = 0 \text{ and } 0° \le A \le 90°,$$

then prove that :

$$\sin 3A = 3\sin A - 4\sin^3 A$$

52. If

$$4 \cos^2 A - 3 = 0,$$

show that :

$$\cos 3A = 4 \cos^3 A - 3 \cos A$$

53. Find A, if

$$0° \leq A \leq 90°$$

and :

$$2 \cos^2 A - 1 = 0$$

54. Find A, if

$$0° \leq A \leq 90°$$

and :

$$\sin 3A - 1 = 0$$

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55. Find A, if

$$0° \leq A \leq 90°$$

and :

$$4\sin^2 A - 3 = 0$$

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56. Find A, if

$$0° \leq A \leq 90°$$

and :

$$\cos^2 A - \cos A = 0$$

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57. Find A, if

$0° \leq A \leq 90°$

and :

$2\cos^2 A + \cos A - 1 = 0$

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58. If

$0° \leq A \leq 90°$,

find A, if :

$\dfrac{\cos A}{1 - \sin A} + \dfrac{\cos A}{1 + \sin A} = 4$

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59. If

$0° \leq A \leq 90°$,

find A, if :

$$\frac{\sin A}{\sec A - 1} + \frac{\sin A}{\sec A + 1} = 2$$

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60. Prove that :

$$(\cos ecA - \sin A)(\sec A - \cos A)\sec^2 A = \tan A$$

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61. Prove the identity

$$(\sin\theta + \cos\theta)(\tan\theta + \cot\theta) = \sec\theta + \cosec\theta$$

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62. Evaluate without using triignometric tables,**

$$\sin^2 28° + \sin^2 62° + \tan^2 38° - \cot^2 52° + \frac{1}{4}\sec^2 30°$$

Questions

1. Prove the identity :

$$\tan A + \cot A = \sec A . \cos ec A$$

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2. Prove that :

$$\cos^4 A - \sin^4 A = 2\cos^2 A - 1$$

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3. Prove that :

$$(1 + \cot A)^2 + (1 - \cot A)^2 = 2\cos ec^2 A$$

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4. Prove that :

$$\tan^4 A + \tan^2 A = \sec^4 A - \sec^2 A$$

5. Prove that :

$$\frac{\sin A}{1 + \cos A} + \frac{1 + \cos A}{\sin A} = 2 \cos ecA$$

6. Prove that :

$$\frac{1 + \cos A}{1 - \cos A} = (\cos ecA + \cot A)^2$$

7. Prove that :

$$\frac{\cot A + \tan B}{\cot B + \tan A} = \cot A \tan B$$

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8. Prove that :

$$\frac{\cos A \cot A}{1 - \sin A} = 1 + \cos ecA$$

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9. Prove that :

$$\frac{\sec A - \tan A}{\cos ecA + \cot A} = \frac{\cos ecA - \cot A}{\sec A + \tan A}$$

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10. Prove that :

$$\sqrt{\frac{1 - \sin A}{1 + \sin A}} = \sec A - \tan A$$

11. Prove that :

$$\frac{\tan A + \sec A - 1}{\tan A - \sec A + 1} = \frac{1 + \sin A}{\cos A}$$

12. Prove that :

$$\frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A} = \cos A + \sin A$$

13. Prove that :

$$\left(1 + \tan^2 A\right) + \left(1 + \frac{1}{\tan^2 A}\right) = \frac{1}{\sin^2 A - \sin^4 A}$$

14. If

$$\tan A + \sin A = m \ \text{ and } \ \tan A - \sin A = n,$$

prove that :

$$m^2 - n^2 = 4\sqrt{mn}$$

15. If

$$x = a \sec A \cos B, \ y = b \sec A \sin B \ \text{ and } \ z = c \tan A,$$

show that :

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1$$

16. Find the value of x, if :

$$\cos x = \cos 60° \cos 30° + \sin 60° \sin 30°$$

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17. Given: $\cos 38° \sec(90° - 2A) = 1,$ find the value of angle A.

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18. Find :

$$\sin 36° 51'$$

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19. Find :

$\tan 53° 38'$

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20. Find :

$\cos 62° 27'$

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21. Find 0, if

$\sin 0 = 0.5798$

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22. Use tables to find, 0 if :

$\tan 0 = 0.8516$