Introduction to trigonometric ratios

Objective type questions (1 mark)

1. If cos A = 4/5 , then the value of tan A is

(A) 3/5

(B)3/4

(C)4/3

(D)5/3.U

2. If sin A = 1/2 , then the value of cot A is

(A) 3

(B) 1/3

(C) 3/2

(D) 1.U

3. The value of the expression [cosec (75° + θ) – sec (15° – θ) –tan(55° + θ)+ cot (35° – θ)] is

(A) – 1

(B) 0

(C) 1

(D) 3/2.U

4. Given that sinq= a/b , then cosq is equal to

(A) b /$\sqrt{b^2 - a^2}$ (B) b/a (C)) $\sqrt{b^2 - a^2}$ / b^2 (D) a/ $\sqrt{b^2 - a^2}$ U

5. If cos (a + b) = 0, then sin (a - b) can be reduced to

(A) cos β

(B) cos 2β

(C) sin α

(D) sin 2α.U

6. The value of (tan1° tan 2° tan3° ... tan 89°) is

(A) 0

(B) 1

(C) 2

(D)1 / 2.s

7. If cos 9α= sinα and 9α < 90°, then the value of tan5α is

(A) 1/√3

(B) √ 3

(C) 1

(D) 0.s

8. If ΔABC is right angled at C, then the value of cos (A+B) is

(A) 0

(B) 1

(C) 1/2

(D)√3/2.U

9. If sinA + $\sin^2$A = 1, then the value of the expression ($\cos^2$A + $\cos^4$A) is

(A) 1

(B) 1/2

(C) 2

(D) 3.s

10. Given that sinα= 1/2 and cosβ =1/2 , then the value of (α + β) is

(A) 0°

(B) 30°

(C) 60°

(D) 90°.U

11. The value of the expression [$\sin^2 22^0 \sin^2 68^0 / \cos^2 22^0 \cos^2 68^0 + \sin^2 63^0 \cos 63^0 \sin 27^0$] is (A) 3

(B) 2

(C) 1

(D) 0.U

12. If $4\tan\theta = 3$, then $[4\sin\theta - \cos\theta] / [4\sin\theta + \cos\theta]$ is equal to

(A) 2/3

(B) 1/3

(C) 1/2

(D) ¾.s

13. If $\sin\theta - \cos\theta = 0$, then the value of $(\sin^4\theta + \cos^4\theta\theta)$ is

(A) 1

(B) 3/4

(C) 1/2

(D) ¼.s

14. $\sin(45° + \theta) - \cos(45° - \theta)$ is equal to

(A) $2\cos\theta$

(B) 0

(C) $2\sin\theta$

(D) 1.U

15. A pole 6 m high casts a shadow $2\sqrt{3}$m long on the ground, then the Sun's elevation is

(A) 60°

(B) 45°

(C) 30°

(D) 90°.A

15. State whether the following are true or false. Justify your answer.K
(i) sin (A + B) = sin A + sin B
(ii) The value of sin θ increases as θ as increases.
(iii) The value of cos θ increases as θ as increases.
(iv) sin θ = cos θ for all values of θ.
(v) cot A is not defined for A = 0^0.

16.In ∆ OPQ, right-angled at P, OP = 7 cm and OQ – PQ = 1 cm, then the values of sin Q.

(a) 7/25

(b) 24/25

(c) 1

(d) none of the these.A

17. If sin A = 24/25, then the value of cosA is

(a) 7/25

(b) 24/25

(c) 1

(d) none of the these.U

18.In ∆ ABC, right-angled at B, AB = 5 cm and ∆ACB = 30° then the length of the side BC is

(a) 5 3

(b) 2 3

(c) 10 cm

(d) none of these.A

19 .9 sec^2A – 9 tan^2 A =

(a) 1 (b) 9 (c) 8 (d) 0.U

21. (1 + tanA + secA) (1 + cotA – cosecA) =

(a) 0 (b) 1 (c) 2 (d) –1.U

22. (sec A + tan A) (1 – sin A) =

(a) sec A

(b) sin A

(c) cosec A

(d)cos A.U

23.If sin 3A = cos (A – 26°), where 3A is an acute angle, find the value of A.

(a) 290

(b) 300

(c) 260

(d) 360.A

24. If tan 2A = cot (A – 18°), where 2A is an acute angle, find the value of A.

(a) 29°

(b) 30°.

(c) 26°

(d) none of these .A

25. If sec 4A = cosec (A – 20°), where 4A is an acute angle, find the value of A.

(a) 22°

(b) 25°

(c) 26°.A

(d) none of these

26. The value of tan 48° tan 23° tan 42° tan 67° is

(a) 1 (b) 9 (c) 8 (d) 0.S

27. If ∆ABC is right angled at C, then the value of cos(A + B) is

(a) 0 (b) 1 (c) ½ (d) n.d.U

28. If cos A = 24/25, then the value of sinA is

(a) 7/25

(b) 24/25

(c) 1

(d) none of the these.U

29. If ∆ABC is right angled at B, then the value of cos(A + C) is

(a) 0 (b) 1 (c) ½ (d) n.d.U

30. If tanA = 4/3, then the value of cosA is

(a) 3/5

(b) 4/3

(c) 1

(d) none of the these.U

31. In a right triangle ABC, right-angled at B, if tan A = 1, then the value of 2 sin A cos A =

(a) 0 (b) 1 (c) ½ (d) n.d.A

32. Given 15 cot A = 8, then sinA =

(a) 3/5

(b) 4/3

(a) 1

(b) (d) none of the these.U

33. In a triangle PQR, right-angled at Q, PR + QR = 25 cm and PQ = 5 cm, then the value of sin P is

(a) 7/25

(b) 24/25

(c) 1

(d) none of the these.A

34. In a triangle PQR, right-angled at Q, PQ = 3 cm and PR = 6 cm, then ∆QPR =

(a) 0° (b) 30° (c) 45° (d) 60°.A

35.If sin (A – B) = 1/2

and cos(A + B) = 1/2, then the value of A and B, respectively

are

(a) 45° and 15°

(b) 30° and 15°

(c) 45° and 30°

(d) none of these.A

36. If sin (A – B) = 1 and cos(A + B) = 1, then the value of A and B, respectively are

(a) 45° and 15°

(b) 30° and 15°

(c) 45° and 30°

(d) none of these.A

37. If tan (A – B) = 1/√3

and tan (A + B) = √ 3 , then the value of A and B, respectively are

(a) 45° and 15°

(b) 30° and 15°

(c) 45° and 30°

(d) none of these.A

38. If cos (A – B) = 3/2
and sin (A + B) = 1, then the value of A and B, respectively are
(a) 45° and 15°
(b) 30° and 15°
(c) 60° and 30°
(d) none of these.A
39.sin 2A = 2 sin A cosA is true when A =
(a) 0°
(b) 30°
(c) 45°
(d) any angle.K
40. sin A = cosA is true when A =
(a) 0°
(b) 30°
(c) 45°
(d) any angle.K
41. If sinA = 1/2, then the value of 3cosA – 4cos3A is
(a) 0 (b) 1 (c) ½ (d) n.d.U
42. If 3cotA = 4, then the value of cos2A – sin2A is
(a) 3/4
(b) 7/25
(c) ½
(d) 24/25.U

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43.Product tan10°.tan20°.tan30°……tan89 is:
(a) 1 (b) –1 (c) 0 (d) 90.S
44. If A + B = 90°, cot B = 3/4
then tanA is equal to;
(a) 3/4
(b) 4/3
(c) 1/4
(d) 1/3.S

45. If Sin (A + B) = 1 = cos(A – B)

then

(a) A = B = 90°

(b) A = B = 0°

(c) A = B = 45°

(d) A = 2B.S

46. The value of sin60°cos30°-

cos60°sin30°is

(a) 1

(b) –1

(c) 0

(d) none of these.K

47. If $4\tan A = 3$, the value of $\frac{2\sin A + \cos A}{3\sin A - 2\cos A}$ is

(a) 20 (b) 10 (c) 15/4 (d) 10/3.U

48. The value of tan 10° tan 35° tan 80° tan 55° is

(a) –1 (b) 0 (c) 1 (d) ∞.S

49. $(\tan^2\theta - \sin^2\theta)(\cot^2\theta - \cos^2\theta) =$

(a)1

(b) $\sin^2\theta \cos^2\theta$

(c) 0

(d) $\tan^2\theta - \cot^2\theta$.U

50. The simplified value of

$1 - \frac{\sin^2\theta}{1+\cos\theta}$ is

(a) cosθ (b) sinθ (c) tan θ (d) cosec θ.U

Very short answer type questions (1 mark)

51. $x = 3\sin^2\theta$, $y = 3\cos^2\theta + 3$, find x + y.U

52. If 2 cos α = 1, find 2α.U

53. In ∆ ABC, ∠B = 90°, ∠A in acute then find tan A – sec A.A

54. If cos(α + β) = 0

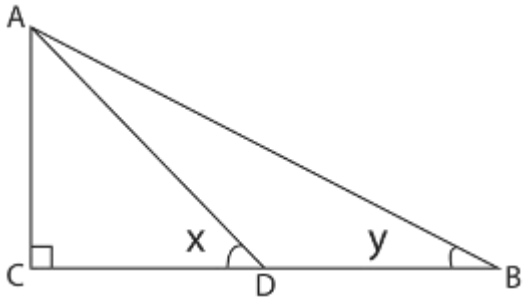
find sin(α +β).U

55. If $\text{cosec}\theta - \cot\theta = \frac{1}{7}$,

find cosec θ + cot θ.U

56. In Δ ABC,

$$CD = \frac{1}{3}BC.$$



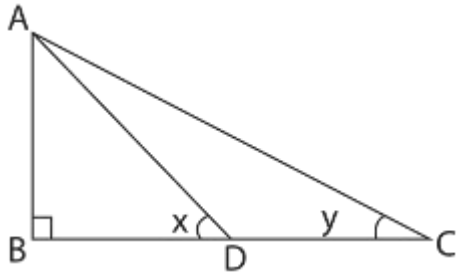
Find $\frac{\sin x}{\sin y} \times \frac{\cos y}{\cos x}$ .S

57. Simplify $: \cos\theta\left\{\frac{1}{\cos\theta} - \frac{1}{\sec\theta}\right\}$ .U

58. If $\sin\theta = \frac{3}{5}$,
find $3(\sin^2\theta - \cos^2\theta)$.U

59. If $\cos\theta - \tan^2\theta = 1$, find $\sec^4\theta + \sin^2\theta$.S

60. If $BD = \frac{1}{3}BC$ find $\frac{\cot y}{\cot x}$ .S



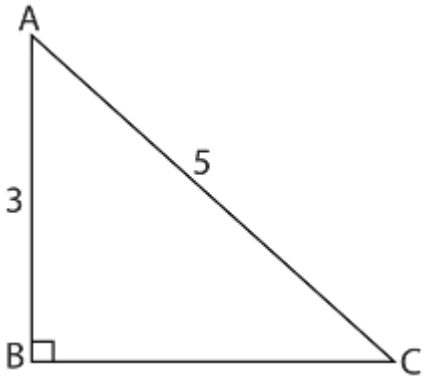
61.If $\sin\theta + \sin^2\theta = 1$,
find $\cos^4\theta + \cos^2\theta$.U

62. If $\sec\theta - \tan\theta = 1/4$
find $\sec\theta + \tan\theta$.U

63.If $a = 5\,\text{cosec}^2\theta - 5$,
$b = 5\cot^2\theta$ then find a/b.A

64. If $\sec\theta + \sec^2\theta = 1$
find $\tan^2\theta + \tan^4\theta$.U

65.



find $\sin^2\theta - \cos^2\theta$.U

66. If $\cot\theta = \frac{8}{9}$,
find
$\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$.U

67. If sec (θ + 20°) = cosec 60° find θ.U

68. If $\sin\theta = \frac{3}{7}$
find $2(\sin^2\theta + \cos^2\theta)$.U

69. If $\sin\theta = 2\sin^2\theta$
find θ

70. $\text{Simplify}\left(\frac{1}{\sin\theta}+\frac{\cos\theta}{\sin\theta}\right)\left(\frac{1-\cos\theta}{\sin\theta}\right)$.S

71. If A, B, C are interior angles of ∆ ABC,
Show that
$\sec^2\frac{A}{2}-\cot^2\left(\frac{B+C}{2}\right)=1$ .A

72. Find the value of
cos 1° · cos 2° · cos 3° · cos4° . . . . cos 90°.S

73.Given that
$\sin A=\frac{\sqrt{3}}{2},\ \cos B=\frac{1}{2}.$
Find A+B.U

74. Find the value of
$7\cot^2\theta - 7\ \text{coscsec}^2\theta$.U

75. Find :
$\frac{\sin A}{\tan A}+\cos A$ .U

76. If $\sec\theta - \tan\theta = 4$
find $\sec\theta + \tan\theta$.U

77. If $3\tan\theta = \sqrt{3}$,

find sin θ.U

78. If $\sin 2\theta = \frac{\sqrt{3}}{2}$ .S
find cos θ

79. Find the maximum value of cosec θ.K

80. In ∆ ABC, ∠A = 90° find the value of cot B × cot C.U

81. If 2 sin 3θ = 1 find θ.U

82. In ∆ PQR, ∠R = 90°, find the value of sin(P + Q).U

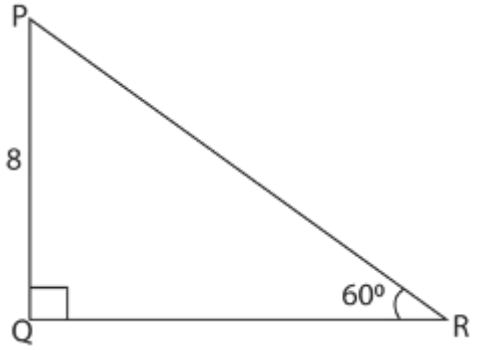
Short answer type questions (2 marks)

83.Evaluate : $\frac{\cot^2 30° + 3\cos^2 45° + 2\operatorname{cosec}^2 60° + 3\sin^2 30°}{\sec^2 60° + \operatorname{cosec} 30° - \tan^2 60°}$

84. 3 cot θ = 5, find the value of
$\frac{3\cos\theta + 4\sin\theta}{3\cos\theta + 5\sin\theta}$

85. $\frac{\operatorname{cosec} 36°}{\sec 54°} + 3\tan 20° \cot 32° \tan 45° \cot 58° \tan 70° + 2(\cos^2 20 + \cos^2 70)$ without using trigonometric table find the value.

86. In ∆ PQR, ∠R = 60. Find PR & QR.



87.Find the value of
(cosec A + cot A) (1 – cos A)

88. If sec 2A = cosec(A – 30) where 2A is an acute angle. Find A.

7. Prove that $\frac{\tan\theta+\sin\theta}{\tan\theta-\sin\theta}=\frac{\sec\theta+1}{\sec\theta-1}$

90. If a cos θ +b sin θ = m
a sin θ – b cos θ = n
prove that $a^2 + b^2 = m^2 + n^2$

91. In ∆ ABC, ∠C is acute, Find the value of sin C + cos C.

92. If 4 cot A = 3, find

$$\frac{\operatorname{cosec}^2 A-1}{\operatorname{cosec}^2 A+1}$$

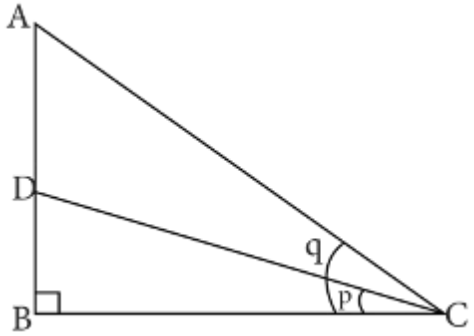
93.Prove that $\frac{\tan(90-\theta)}{\cot\theta}+\frac{\sec\theta\cos(90-\theta)}{\tan(90-\theta)}=\sec^2\theta$

94. If x = a + b sec θ, y = c + d tan θ prove that

$$\left(\frac{x-a}{b}\right)^2-\left(\frac{y-c}{d}\right)^2=1$$

95. $\operatorname{cosec}^2\theta + \tan^2(90-\theta) = 2\sec^2(90-\theta) - 1$

96.In the figure, $BD=\frac{1}{3}AB.$ Find $\frac{\tan p}{\tan q}$



97. Simplify :
2(cosec θ + cot θ) (1 − cos θ)

98. Two poles of height 12 m and 17 m stands vertically on a plane ground. If the distance between their feet is 7√3 m, then find the distance between their tops.

99. Prove that

$$\operatorname{cosec}^2\left(\frac{A+B}{2}\right)-1=\tan^2\frac{c}{2}$$

100. In XYZ, ∠X = 90°, ∠Z = 45° If XY = 12 cm find YZ and XZ.

101. If x = a + b cosec θ,
y = c + d cot θ,
Prove that

$$\left(\frac{x-a}{b}\right)^2-\left(\frac{y-c}{d}\right)^2=1$$

102. If $\sin\theta=\frac{4}{7}$
find $\sec^2\theta+\cos^2\theta$

103. If $\tan\theta=\frac{3}{7}$ find $\frac{5\sin\theta+4\cos\theta}{5\sin\theta-4\cos\theta}$

104. (1 + tan θ – sec θ) (1+ cot θ + cosec θ) = 2

105. $\frac{\sin A}{1-\cos A}+\frac{1-\cos A}{\sin A}=2\operatorname{cosec} A$

106. Find K if

$$\frac{\sin 40}{\cos 50}+\frac{3\operatorname{cosec}\theta}{\sec(90-\theta)}=3K$$

107. Given that

$\sin\alpha=\frac{\sqrt{3}}{2}$ & $\cos\beta=\frac{\sqrt{3}}{2}$ find the value of α + β.

108.Given that
sin(A – B) = sin A cos B – cosAsin B,
find sin 15°

109. Prove that
$\tan^2\theta+\cot^2\theta+2=\sec^2\theta\operatorname{cosec}^2\theta$

110. If sec θ = 3x,

$\tan\theta=\frac{3}{x}$ find $\left(x^2-\frac{1}{x^2}\right)$

111. Prove that

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

112.Prove that

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

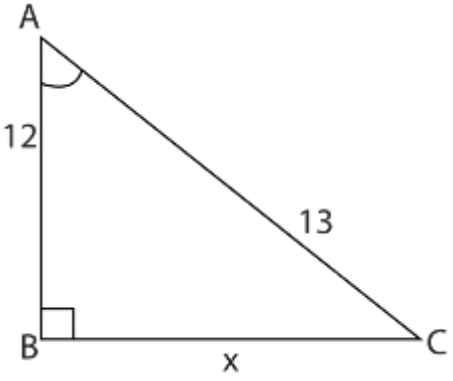
113. Without using trigonometric tables evaluate :

$$\frac{5\cot 40\cot 28\cot 62\cot 50-\frac{1}{3}\cot^2 30}{3\left(\sin^2 28+\sin^2 62\right)}$$

114. Express cosec A in terms of tan A.

115. In Δ ABC, $\angle B = 90°$,

AC = 13 cm, AB = 12 cm determine the value of cos A and cot A.



116. When cosθ> 0. Solve

$$2\cos^2\theta=\frac{1}{2}$$

117. Using the formula,
sin(α + β) = sin αcosβ + cosαsinβ,
find sin 75°.

118. Prove that

$$1+\frac{\cot^2\theta}{1+\operatorname{cosec}\theta}=\operatorname{cosec}\theta$$

119. If θ is 30°, verify 3 sin 3θ = 3sin θ – 4sin^3 θ.

120. Using the formula sin(A – B) = sin A cos B – cos A sin B, find the value of sin 15°.

121. Prove that : $\frac{\sin\theta}{1+\cos\theta}+\frac{1+\cos\theta}{\sin\theta}=2\operatorname{cosec}\theta$

122. Prove :
(sin^6 θ + cos^6 θ) =
1 – 3 sin^2 θ cos^2 θ

123. Prove that

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

124.Prove :
(sin θ + cosec θ)^2 + (cos θ + secθ)^2 = 7 + tan^2 θ + cot^2 θ.

125. Prove the following identity.

$\sqrt{\sec^2\theta + \operatorname{cosec}^2\theta} = \tan\theta + \cot\theta.$

126. Given

$\sin(A - B) = \frac{1}{2}$ and $\cos(A + B) = \frac{1}{2},$

Find A & B.

127. Eliminate θ from the equations x = a sin θ,
y = a cosθ.

128. Prove that

$\cos^6\theta + \sin^6\theta = 1 - 3\sin^2\theta\cos^2\theta$

129.Show that

$\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \operatorname{cosec}\theta + \cot\theta.$

130. If $\cos\theta = \frac{\sqrt{3}}{2}$ and 'θ' is an acute, find the value of $4\sin^2\theta + \tan^2\theta$.

131. Eliminate 'θ' from the following equations

x = sec θ + tan θ

y = sec θ– tan θ

132. Prove that :

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

133. Prove that :

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

134. Find the value of

cos 30° cos 60° – sin 30° sin60°

135. If sec(30° + θ) = cosec 40°, find θ.

136. Find the value of

sec θ cosec(90 – θ) – tan θ
cot(90 – θ).

137. If $\cos\theta = \frac{1}{2}$ find

cos θ (cos θ – sec θ)

138. The value of $\sin^2 60 + \cos^2 45 + \cos^2 60$

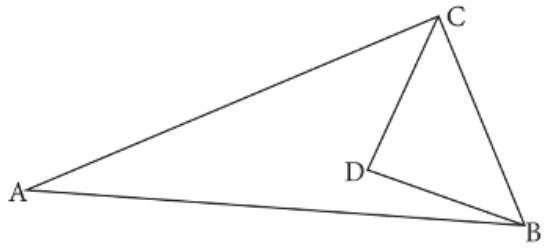
Short answer type questions (3 marks)

139.In ∆ DEF, ∠E = 90°, DF – DE = 2 cm, EF = 6 cm.

140.Find cos0°+ sin0°

141.In the figure, ACB = 90°, ∠BDC = 90° CD = 2 cm, BD = 3 cm, AC = 13 cm

then find cos A – sin A



142.Prove that

$$\frac{\cot\theta-\tan\theta}{\cos\theta\sin\theta}=\operatorname{cosec}^2\theta-\sec^2\theta$$

143.In ∆ ABC, ∠B = 90°, BC = 10 and AC – AB = 4.

Find sec A – tan A

144. Without using trigonometric table, evaluate :

$$\frac{\cos^2 10+\cos^2 80}{\sec^2 50-\cot^2 40}+2\operatorname{cosec}^2 50-2\cot 50\tan 40-4\tan 37\tan 45\tan 53$$

145. If 4 sin θ + 3 cos θ = 3 find 3 sin θ – 4 cos θ.

146. If $\sin(A-B)=\frac{1}{2},\ \cos(A+B)=\frac{1}{2},$ 0 < A + B ≤ 90°, find A and B

147. Prove that $\frac{\tan(90-\theta)}{\cot\theta}+\frac{\sec(90-\theta)\cos\theta}{\cot(90-\theta)}=\operatorname{cosec}^2\theta$

148. If $\tan\theta=\frac{1}{\sqrt{5}},$ find

$$\frac{\sec^2\theta-\operatorname{cosec}^2\theta}{\sec^2\theta+\operatorname{cosec}^2\theta}$$

149. Prove that

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

150. Prove that

$$\frac{\sin(90-\theta)}{1+\cos(90-\theta)}+\frac{1+\cos(90-\theta)}{\sin(90-\theta)}=2\sec\theta$$

151. If $\cos(A-B)=\frac{\sqrt{3}}{2}, \cos(A+B)=\frac{1}{2}$ $0 < A + B \le 90°$, $A > B$ find A & B

152. Prove that $\frac{\cot\theta-1+\operatorname{cosec}\theta}{\cot\theta+1-\operatorname{cosec}\theta}=\frac{1+\cos\theta}{\sin\theta}$

153. Prove that $\sqrt{\frac{\sec\theta-1}{\sec\theta+1}}+\sqrt{\frac{\sec\theta+1}{\sec\theta-1}}=2\operatorname{cosec}\theta$

154. If cosec θ + cot θ = a find cos θ in terms of a.

155. $2\sin(A+B)=\sqrt{3}$, $\cos(A-B)=1$, $0° < (A+B) < 90°$, $A \ge B$, find A and B.

156. Evaluate : $\frac{\sin^2(90-\theta)+\sin^2\theta}{3(\sin^2 40+\sin^2 50)}+\frac{3}{5}\cos 42°\operatorname{cosec}48°-\frac{2}{3}\tan^3 60°$

157. If $\sin\theta+\sin^2\theta=1$, prove that
$\cos^{12}\theta+3\cos^{10}\theta+3\cos^8\theta+\cos^6\theta+2\cos^4\theta+2\cos^2\theta-2=1$

158. Evaluate : $\frac{\sin 25°}{\cos 65°}+\frac{\cos 50°\operatorname{cosec}40°}{\tan 15°\tan 25°\tan 45°\tan 75°\tan 65°}$

159. If $\cos\theta-\sin\theta=\sqrt{2}\sin\theta$ find $\cos\theta+\sin\theta$

160. Prove that $\sin^8\theta-\cos^8\theta=(1-2\cos^2\theta)(1-2\sin^2\theta\cos^2\theta)$

161. Express cos A in terms of cot A.

162.Prove that

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

163. Without using trigonometric tables evaluate.

$$\frac{\operatorname{cosec}^2\theta-\tan^2(90-\theta)}{3\left(\sin^2 40+\sin^2 50\right)}-\frac{4\tan^2 60°\sec^2 58\sin^2 32}{\tan^2 35-\operatorname{cosec}^2 55}$$

164. Prove that

$$1+\frac{\tan^2\theta}{1+\sec\theta}=\frac{1}{\cos\theta}$$

165. Without using trigonometric tables, evaluate

$$\frac{\sec^2\theta-\cot^2(90-\theta)}{3\left(\sin^2 32°+\sin^2 58\right)}-\frac{2\cot^2 45°\sec^2 32°\sin^2 58°}{-\operatorname{cosec}^2 40+\tan^2 50}$$

166. Prove that

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

167. If $\sin\theta=\frac{15}{17}$, then find the value of $\frac{15\cot\theta+17\sin\theta}{8\tan\theta+16\sec\theta}$.

168. Prove the identity: $\frac{\tan A + \cot B}{\cot A + \tan B} = \tan A \cdot \cot B.$

169. In a right angled triangle ABC right angled at B, $\sin A = \frac{\sqrt{3}}{2}$, find the value of $(\sin^2 A + \cos^2 C) - \sin^2 C \cdot \cos^2 A$.

170. Evaluate : $\frac{\cos^2(45° + \theta) + \cos^2(45° - \theta)}{\tan(60° + \theta)\tan(30° - \theta)} + \left(\frac{\sin 47°}{\cos 43°}\right)^2 - 2\cos^2 45°$

171. If $7 \sin^2 A + 3\cos^2 A = 4$, show that $\tan A = \frac{1}{\sqrt{3}}$, where A is an acute angle.

172. Show that

$$\frac{\cos\theta - 2\cos^3\theta}{2\sin^3\theta - \sin\theta} = \cot\theta$$

173. In Δ ABC, $\angle B = 90°$, if

$\tan A = \frac{1}{\sqrt{3}}$ find the value of

sin A sin C + cos A cos C

174. Prove that

(1 + cosec θ) (1 – sin θ) =

cos θ cot θ

175. If 4 cot A = 5 then $\frac{1 - \tan^2 A}{1 + \tan^2 A}$

176. Without using trigonometric table evaluate :

$$\frac{\cos 68°}{\sin 22°} + \frac{\sin 24°}{\cos 66°} - \frac{\cos 36° \sec 36°}{\tan 12 \tan 35 \tan 78 \tan 65}$$

177. Prove that

$$\frac{\sin\theta}{\cot\theta + \operatorname{cosec}\theta} - \frac{\sin\theta}{\cot\theta - \operatorname{cosec}\theta} = 2$$

178.In Δ ABC,

right angled at B,

$\tan A = \frac{1}{\sqrt{3}}$,

find cos A sin C – sin A cos C

179.If A = 30, verify that

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

180.Prove that

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

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

181. Show that

182. Solve :

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

183. $$\text{Solve: } \frac{\cos^2\theta - 3\cos\theta + 2}{\sin^2\theta} = 1$$

184. $$\text{Solve: } \frac{\cos\theta}{1-\sin\theta} + \frac{\cos\theta}{1+\sin\theta} = 4$$

185.Prove that

$$\left(\frac{1+\sin\theta-\cos\theta}{1+\sin\theta+\cos\theta}\right) = \frac{1-\cos\theta}{1+\cos\theta}$$

186. Show that $\sin^6\theta + \cos^6\theta = 1 - 3\sin^2\theta\cos^2\theta$

187. $$\text{Show that } (\sec\theta + \tan\theta)^2 = \frac{1+\sin\theta}{1-\sin\theta}$$

188. Prove that $$\frac{1}{\sec\theta - \tan\theta} - \frac{1}{\cos\theta} = \frac{1}{\cos\theta} - \frac{1}{\sec\theta + \tan\theta}$$

189. Show that

$$\frac{\cot\theta + \operatorname{cosec}\theta - 1}{\cot\theta - \operatorname{cosec}\theta + 1} = \frac{1+\cos\theta}{\sin\theta}$$

190. Show that

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

191. Show that

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

192.Show that

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

193.Without using tables, evaluate $$\cos(20^\circ + \theta) - \sin(70^\circ - \theta) + \frac{\cos^2 50^\circ + \sin^2 40^\circ}{\sin^2 50^\circ + \cos^2 40^\circ}$$

194. Show that

$$\frac{1-\cos\theta}{1+\cos\theta} = (\operatorname{cosec}\theta - \cot\theta)^2$$

195. Show that

$$\frac{1+\cos\theta}{\sin\theta}+\frac{\sin\theta}{1+\cos\theta}=2\operatorname{cosec}\theta$$

196. Prove that

$$\frac{\sin(90-\theta)}{1+\cos(90-\theta)}+\frac{1+\cos(90-\theta)}{\sin(90-\theta)}=2\sec\theta$$

197. If A, B, C are interior angles of Δ ABC, show that

$$\operatorname{cosec}^2\left(\frac{B+C}{2}\right)-\tan^2\frac{A}{2}=1$$

198. Prove that

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

199. If $\sin\theta=\frac{n}{m}$, find the value of

$$\frac{\tan\theta+4}{4\cot\theta+1}$$

Long answer type questions (4 marks)

200. If $3\sin\theta-\cos\theta=p$ and $\sin\theta-2\cos\theta=q$ then prove that $p^2+2q^2-2pq=$

201. Prove that

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

202. Prove that

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

203. Prove that

$$\frac{\cos\theta-\sin\theta+1}{\cos\theta+\sin\theta-1}=\operatorname{cosec}\theta+\cos\theta$$

204. Prove that

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

205. If $\operatorname{cosec}\theta+\cot\theta=p$, write, $\cos\theta$ in terms of p.

206. Prove that

$$\frac{\cot\theta}{1-\tan\theta}+\frac{\tan\theta}{1-\cot\theta}=\sec\theta\operatorname{cosec}\theta+1$$

207. If $\cos\theta=\frac{x}{y}$ find the value of

$$\frac{\cot\theta+6}{6\tan\theta+1}$$

208.If p cos θ + q sin θ = r, then

Prove that $p\sin\theta - q\cos\theta = \sqrt{p^2 + q^2 - r^2}$

209.Prove that

$$\frac{\cos^2\theta}{1-\tan\theta} + \frac{\sin^3\theta}{\sin\theta - \cos\theta} = 1 + \sin\theta\cos\theta$$

210.Prove that $\sin^{-6}\theta - \cot^6\theta = 1 + 3\cot^2\theta \sin^{-2}\theta$.

211.Prove that :

$$\frac{1+\tan A}{\operatorname{cosec} A} + \frac{1+\cot A}{\sec A} = \sec A + \operatorname{cosec} A$$

212.Prove that

$$\frac{\sin\theta}{1-\cos\theta} + \frac{\tan\theta}{1+\cos\theta} = \sec\theta\,\operatorname{cosec}\theta + \cot\theta$$

213.Prove that

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

214.If sec θ + tan θ = x
find sin θ.

215.Prove that

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

216.If 7 sin θ – 5 cosθ = 5,
find 5 sinθ + 7 cos θ.

217.If x = c + a sec θ, y = d +btan θ, Prove that

$$\left(\frac{x-a}{a}\right)^2 - \left(\frac{y-d}{b}\right)^2 = 1$$

218. If x = rsin αcosγ, y = r sin α sin γ and z = r cos α, prove that $r^2 = x^2 + y^2 + z^2$

219. If a cosθ – b sin θ = c prove that $a\sin\theta + b\cos\theta = \sqrt{a^2 + b^2 - c^2}$

220. If m sinθ = n cosθ, then show that

$$\frac{n\sin\theta - m\cos\theta}{n\sin\theta + m\cos\theta} = \frac{n^2 - m^2}{n^2 + m^2}$$

221. If 3 sinθ + 5 cosθ = 5 show that 5 sinθ – 3cos θ = +3

222. If cosec θ + cotθ = p, then show that

$$\frac{p^2 - 1}{p^2 + 1} = \cos\theta$$

223. If sec θ – tan θ = p, then show that

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

224. If x = sin A – cosec A, n = cos A – sec A, show that

$$\tan A = \left(\frac{n}{x}\right)^{1/3}$$

225. If $x = a\cos\theta - b\sin\theta$, $y = a\sin\theta + b\cos\theta$ then show that $x^2 + y^2 = a^2 + b^2$

226. If $\cot A + \cos A = x$, $\cot A - \cos A = n$, then show that $x^2 - n^2 = 4\sqrt{xn}$

227. If $\operatorname{cosec}\theta = x + \frac{1}{4x}$, prove that

$$\operatorname{cosec}\theta + \cot\theta = 2x \text{ or } \frac{1}{2x}$$

228. If $\cot\theta = x - \frac{1}{4x}$ prove that

$$\cot\theta + \operatorname{cosec}\theta = 2x \text{ or } \frac{-1}{2x}$$

229. If $\sec\theta = x + \frac{1}{4x}$, prove that

$$\sec\theta + \tan\theta = 2x \text{ or } \frac{1}{2x}$$

230. If $\sin\theta + \cos\theta = p$, $\sec\theta + \operatorname{cosec}\theta = q$, then prove that $q(p^2 - 1) = 2p$

231. If $x = c + a\sin\theta$, $y = d + b\cos\theta$, prove that

$$\left(\frac{x-c}{a}\right)^2 + \left(\frac{y-d}{b}\right)^2 = 1$$

232. If $\cos\theta + \sin\theta = \sqrt{2}\cos\theta$, find $\cos\theta - \sin\theta$.

233. If $\cos A - \sin A = 1$ then prove that $\cos A + \sin A = 1$ or -1

234. If $\cos^2\theta - \sin^2\theta = \tan^2\phi$, prove that

$$\cos\phi = \frac{1}{\sqrt{2}\cos\theta}$$

235. Prove that

$$\frac{\sec\theta}{\sec\theta - 1} + \frac{\sec\theta}{\sec\theta + 1} = 2\operatorname{cosec}^2\theta$$ .U

236. If $\cot^2\theta = 1 - a^2$ prove that $\operatorname{cosec}\theta + \cot^3\theta\sec\theta = (2 - a^2)^{3/2}$.S

237. Show that

$$\frac{1+\sin\theta}{\cos\theta} = \frac{1+\cos\theta+\sin\theta}{1+\cos\theta-\sin\theta}$$ .S

238. Prove that

$(1 + \cot\theta - \operatorname{cosec}\theta)(1 + \tan\theta + \sec\theta) = 2$.U