Ravi Maths Tuition

Introduction to Trigonometry

10th Standard

Maths

Multiple Choice Question 96 x 1 = 96

1) $\frac{2\tan 30^\circ}{1+\tan^2 30^\circ}$ =

(a) sin 60° (b) cos 60° (c) tan 60° (d) sin 30°

2) $\frac{1-\tan^2 45^\circ}{1+\tan^2 45^\circ}$ =

(a) tan 90° (b) 1 (c) sin 45° (d) 0

3) sin 2A = 2 sin A is true, when A =

(a) 0° (b) 30° (c) 45° (d) 60°

4) $\frac{2\tan 30^\circ}{1-\tan^2 30^\circ}$ =

(a) cos 60° (b) sin 60° (c) tan 60° (d) sin 30°

5) $9\sec^2 A - 9\tan^2 A$ =

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

6) $(1 + \tan\theta + \sec\theta)(1 + \cot\theta - \text{cosec}\,\theta)$ =

(a) 0 (b) 1 (c) 2 (d) -1

7) (sec A + tan A) (1 − sin A) =

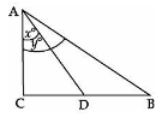
(a) sec A (b) sin A (c) cosec A (d) cos A

8) $\frac{1+\tan^2 A}{1+\cot^2 A} =$

(a) $\sec^2 A$ (b) −1 (c) $\cot^2 A$ (d) $\tan^2 A$

9) The square root $\frac{1+sin\ \ A}{1-sin\ \ A}$ =

(a) cot A − cosec A (b) sec A − tan A (c) sec A + tan A (d) cot A + cosec A

10) 

In figure, if D is mid-point of BC, the value of $\frac{cot\ \ y^o}{cot\ \ x^o}$ is:

(a) 1/3 (b) 1/2 (c) 1/4 (d) 2

11) If cos (∝+β)=0 , then sin (∝-β) can be reduced to

(a) cos β (b) sin α (c) sin 2α (d) cos 2β

12) if cosec27o = $\frac{y}{x}$, then $\sec 27^o - \sin 63^o$ =

(a) $\frac{x}{y}$ (b) $\frac{x^2}{y^2}$ (c) $\frac{x^2}{y\sqrt{y^2-x^2}}$ (d) $\frac{x^2}{\sqrt{y^2-x^2}}$

13) If $\sin(2\alpha + 45^\circ) = \cos(30^\circ - \alpha)$, where, $0^\circ < \alpha < 90^\circ$, then the value of α in degrees is.

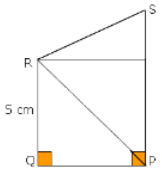
(a) 35° (b) 5° (c) 15° (d) 25°

14) $\sin(60^\circ + \theta) - \cos(30^\circ - \theta)$ is equal to (where $(60^\circ + \theta)$ and $(30^\circ - \theta)$ are both acute angles):

(a) 1 (b) 2 sin θ (c) 0 (d) 2 cos θ

15) If $\sin 3\theta = \cos(\theta - 60)$ where θ and $(\theta - 6)$ are acute angles, the value of θ is

(a) 60° (b) 24° (c) 30° (d) 90°

16) 

In given figure, if RP = 13 cm, QR = 5 cm and PS = 14 cm, then, tan S =In given figure, if RP = 13 cm, QR = 5 cm and PS = 14 cm, then, tan S =

(a) 4/3 (b) 9/4 (c) 8/4 (d) 5/4

17) The value of $\frac{cot\ \ 54^o}{tan\ \ 36^o} + \frac{tan\ \ 20^o}{cot\ \ 70^o} - 2$

(a) 1 (b) 2 (c) 0 (d) 3

18) Simplify $\frac{1+cot\ \ A}{sin\ \ A} + \frac{sin\ \ A}{1+cos\ \ A}$

(a) 2 sec A (b) 2 cosec A (c) 2 sin A (d) 2 cos A

19) Which of the following is defined?

(a) cot 0° (b) cosec 90° (c) tan 90° (d) sec 90°

20) if $\tan\theta + \cot\theta = 2$ then the value of $\tan^2\theta + \cot^2\theta$ is

(a) 0 (b) 2 (c) 3 (d) 1

21) The value of $\text{cosec}^2 30° \sin^2 45° - \sec^2 60°$ is

(a) 2 (b) 1 (c) -2 (d) 0

22) When $0° < \theta < 90°$ and $3\tan^2\theta - 1 = 0$. Then is equal to

(a) 30° (b) 90° (c) 60° (d) 45°

23) The value of for which $2\cos^2\theta + b\ \text{cosec}\ \theta = p$ and $b\cot + a\ \text{cosec}\ \theta = q$ then $p^2 - q^2$ is equal to

(a) a^{2+b^2} (b) b^{2+a^2} (c) b^{2-a^2} (d) a^{2-b^2}

24) The value of θ for which $2\cos^2\theta + \sin\theta - 2 = 0$, $0^o < \theta \leq 90^o$

(a) 30° (b) 10° (c) 60° (d) 45°

25) If A and B are the angles of a right angled triangle ABC, right angled at C then 1+cot2A=

(a) $\cot^2 B$ (b) $\tan^2 B$ (c) $\cos^2 B$ (d) $\sec^2 B$

26) If $\tan\theta = \frac{12}{5}$ then $\frac{1+sin\theta}{1-sin\theta}$ is equal to

(a) 9 (b) 12/13 (c) 24 (d) 25

27) If $3\cot A = 4$, then find $\cos^2 A - \sin^2 A$

(a) 25/7 (b) 1/25 (c) 22/7 (d) 7/25

28) If $7\sin^2 x + 3\cos^2 x = 4$ then , secx + cosecx =

(a) $2\sqrt{3}$ (b) $2 + \frac{\sqrt{3}}{2}$ (c) $\frac{\sqrt{3}}{2}$ (d) $2 + \frac{2}{\sqrt{3}}$

29) The value of expression $\frac{1-tan\ \ x}{1-tan\ \ x} \frac{cot(90^o - x)}{cot(90^o - x)}$ is

(a) $2\cot^2 x - 1$ (b) $2\cos^2 x - 1$ (c) $2\sin^2 x - 1$ (d) $2\tan^2 x - 1$

30) If $\sin\theta = 1/2$, then the value of $\sin\theta\ (\sin\theta - \text{cosec}\ \theta)$ is

(a) √3/2 (b) -√3/2 (c) 3/4 (d) -3/4

31) If = $\frac{cos\quad\theta}{1-sin\quad\theta}$ 4 then, θ =

(a) 45° (b) 90° (c) 60° (d) 30°

32) The express sin A in terms of cot A is

(a) $\frac{\sqrt{1+cot^2\quad A}}{cot\quad A}$ (b) $\frac{\sqrt{1-cot^2\quad A}}{cot\quad A}$ (c) $\sqrt{\frac{1-cot^2\quad A}{cot\quad A}}$ (d) $\frac{1}{\sqrt{1+cot^2\quad A}}$

33) If angles C,B and A of a right angled triangle ABC, right angled at A, form an increasing A.P.. then, sinA x cosB =

(a) 3/4 (b) 1/2 (c) 3/5 (d) 5/4

34) If sin (A – B) = 1/2 and cos (A + B) =1/2 then the value of B is

(a) 15° (b) 45° (c) 0° (d) 60°

35) If sinθ = cosθ, then the value of θ is:

(a) 45° (b) 30° (c) 90° (d) 60°

36) If tan 2A = cot (A – 18°), then the value of A is

(a) 36° (b) 27° (c) 18° (d) 24°

37) $\left(\frac{cos\quad A}{cot\quad A}+sin\quad A\right)$is

(a) 2 cos A (b) cot A (c) sec A (d) 2 sin A

38) [$\cos^4$ A – $\sin^4$A] is equal to:

(a) 2 $\cos^2$ A + 1 (b) 2 $\cos^2$ A – 1 (c) 2 $\sin^2$ A + 1 (d) 2 $\sin^2$ A – 1

39) If cos (40° + A) = sin 30°, the value of A is

(a) 40° (b) 30° (c) 60° (d) 20°

40) Which of the following is defined

(a) tan 90° (b) cot 0° (c) cosec 90° (d) sec 90°

41) If $\text{cosec}^2\theta$ (1 + cosθ) (1 – cosθ) = ,λ then the value of λ is

(a) 1 (b) -1 (c) $\cos^2\theta$ (d) 0

42) Using the formula cos 2θ =1-2 $\sin^2$ θthe value of sin15° is

(a) $\frac{\sqrt{2-\sqrt{3}}}{2}$ (b) 0 (c) 1 (d) 3

43) If x = 3 $\sec^2$ – 1, y = $\tan^2$ – 2 then x – 3y is equal to

(a) 4 (b) 8 (c) 5 (d) 3

44) The value of 5 $\tan^2\theta$ - 5 $\sec^2\theta$ is

(a) -5 (b) 0 (c) 1 (d) 5

45) If $\frac{x}{a}cos\theta+\frac{y}{b}sin\theta=1\quad and\quad \frac{x}{a}sin\theta-\frac{y}{b}cos\theta\quad then\quad \left(\frac{x}{a}\right)^2+\left(\frac{y}{b}\right)^2=$

(a) 12 (b) 3 (c) 2 (d) 1

46) If cos A= 2 sin A, then the value of cosec A is

(a) 5 (b) -5 (c) ±5 (d) ±√5

47) Simplify : $\frac{sinA\quad+\quad cosA}{SinA-cosA}+\frac{sinA\quad-\quad cosA}{SinA+cosA}$

(a) 2($\sin^2$A-$\cos^2$A) (b) $\frac{2}{sin^2A+cos^2A}$ (c) 3($\sin^2$A-$\cos^2$A) (d) $\frac{2}{sin^2A-cos^2A}$

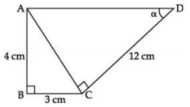
48) If a cosθ + b sinθ = 4 and a sinθ – b cosθ = 3, then $a^2 + b^2$ is

(a) 12 (b) None (c) 25 (d) 7

49) If cos A + sin A = √2 sinA , Then, Find sin A – cos A

(a) √2 sinA (b) 2 cos A (c) 2 sin A (d) √ 2 cos A

50) In figure below sec α is:



(a) 12/5 (b) 13/12 (c) 12/13 (d) 5/12

51) If A + B = 90°, then, cosA.cosecB – cosA.sinB =

(a) 2 sin A (b) $\sin^2 A$ (c) $\cos A^2$ (d) cos 2A

52) The value of $cosec\theta\sqrt{1-cos^2\theta}$is

(a) -1 (b) 3 (c) 1 (d) 0

53) If $\tan\theta = \frac{12}{5}$ then $\frac{1+sin\theta}{1-sin\theta}$ is equal to

(a) 25 (b) 12/13 (c) 24 (d) 9

54) $\frac{sin\theta}{1-cos\theta}$ is equal to

(a) $\frac{1-cos\theta}{sin\theta}$ (b) $\frac{1+cos\theta}{sin\theta}$ (c) $\frac{1-cos\theta}{cos\theta}$ (d) $\frac{1-sin\theta}{cos\theta}$

55) If cos A + $\cos^2$ A = 1, then $\sin^2$ A + $\sin^4$ A is

(a) 2 (b) -1 (c) 0 (d) 1

56) The value of $\frac{cos30^o+sin60^o}{1+cos60^o+sin30^o}$ is

(a) 3/2 (b) √3/2 (c) 1 (d) 2/√3

57) If x = $2\sin^2\theta$, y = $2\cos^2$ + 1, then the value of x + y is:

(a) 1 (b) 1/2 (c) 3 (d) 2

58) If a cot θ + b cosec θ = p and b cot θ + a cosec θ = q then $p^2 - q^2$ is equal to:

(a) $b^2 + a^2$ (b) $b^2 - a^2$ (c) $a^2 - b^2$ (d) $a^2 + b^2$

59) If cos A $= \frac{4}{5}$ then the value of tan A is

(a) 3 / 5 (b) 3 / 4 (c) 4 / 3 (d) 5 / 3

60) If sec 5 A = cosec(A + 30°), where 5A is an acute angle, then the value of A is

(a) 15° (b) 5° (c) 20° (d) 10°

61) If tan θ + sin θ = m and tan θ- sin θ = n, then m^2 - n^2 is equal to

(a) $\sqrt{mn}$ (b) $\sqrt{\frac{m}{n}}$ (c) $4\sqrt{mn}$ (d) None of these

62) The value of tan 1°tan 2° tan 3° ... tan 89° is

(a) 0 (b) 1 (c) ∞ (d) None of these

63) If sin A $= \frac{1}{2}$ then the value of cot A is

(a) $\sqrt{3}$ (b) $\frac{1}{\sqrt{3}}$ (c) $\frac{\sqrt{3}}{2}$ (d) 1

64) If x $\sin^3\theta$ + y $\cos^3\theta$ = sin θ cos θ and x sin θ = ycos θ, then $x^2 + y^2$ is equal to

(a) 0 (b) 1 / 2 (c) 1 (d) 3 / 2

65) If tan 2 A = cot (A -18°), where 2 A is an acute angle, then the value of A is

(a) 12° (b) 18° (c) 36° (d) 48°

66) If sin $\theta = \frac{a}{b}$, then cos θ is equal to

(a) $\frac{b}{\sqrt{b^2-a^2}}$ (b) $\frac{b}{a}$ (c) $\frac{\sqrt{b^2-a^2}}{b}$ (d) $\frac{a}{\sqrt{b^2-a^2}}$

67) If cos 9 α = sin α and value of tan 5 α is 9 α < 90°, then the

(a) $\frac{1}{\sqrt{3}}$ (b) $\sqrt{3}$ (c) 1 (d) 0

68) If cos $^2\theta$ + 2 sin ^{2} θ+ 3 cos $^2\theta$ + 4 sin $^2\theta$ + ... 200 terms = 10025, where θ is acute, then the value of sin θ - cos θ is

(a) $\frac{1-\sqrt{3}}{2}$ (b) $\frac{1+2\sqrt{3}}{2}$ (c) $\frac{\sqrt{3}-1}{2}$ (d) 0

69) If $0 < \theta < \frac{\pi}{4}$ then the simplest form of $\sqrt{1-2\sin\theta\cos\theta}$ is

(a) sin θ - cos θ (b) cos θ - sin θ (c) cos θ + sin θ (d) sin θ cos θ

70) If(sec A + tan A) (see B + tan B)(secC + tan C) = (see A - tan A) (sec B - tan B)(sec C- tan C) = X, then the value/ values of x is /are

(a) ± 1 (b) 0 (c) ± 2 (d) 1

71) If sinθ + sin$^2\theta$ = 1,then find the value of Cos$^{12}\theta$ + 3 cos$^{10}\theta$ + 3 cos$^8\theta$ + cos$^6\theta$ + 2 cos$^4\theta$+ 2 cos$^2\theta$ - 2.

(a) 0 (b) 1 (c) cos θ (d) sin θ

72) If 0°< x < 90° and 2 sin x + 15 cos^2 x = 7, then find the value of tan x .

(a) $4/5$ (b) $3/5$ (c) $3/4$ (d) $4/3$

73) If f(x) = cos 2 x+ sec^2 x, then f(x)

(a) ≥ 1 (b) ≤ 1 (c) ≥ 2 (d) ≤ 2

74) If ABC is a right angled triangle, then find the relation between $\tan\left(\frac{A-B-C}{2}\right)$ and $-\tan\left(\frac{A+B-C}{2}\right)$

(a) equal (b) Unequal (c) sum of these equal to 1 (d) None of the above

75) If sinθ + sin$^2\theta$ + sin$^3\theta$ = 1,then cos $^6\theta$ - 4 cos$^4\theta$ + 8 cos$^2\theta$ is equal to

(a) 1 (b) 2 (c) 3 (d) 4

76) If $m = a\cos^3\theta + 3a\cos\theta\sin^2\theta$ and $n = a\sin^3\theta + 3a\cos^2\theta\sin\theta$, $(m+n)^{2/3} + (m-n)^{2/3}$ is equal to

(a) $2a^{2/3}$ (b) $a^{2/3}$ (c) $2a^{3/2}$ (d) $a^{3/2}$

77) If a secθ + b tanθ + c = 0 and p secθ + q tanθ + r = 0, then (br - qc)^2 - (pc- ar)^2 is equal to

(a) (ap - bq)^2 (b) (aq - bp)^2 (c) (ap - bq) (d) (aq - bp)

78) If cos $\theta = \frac{1}{\sqrt{2}}$, then tan θ is equal to

(a) $\frac{1}{\sqrt{2}}$ (b) 0 (c) 1 (d) $\sqrt{2}+1$

79) If cos θ = $\frac{\sqrt{3}}{2}$ and sin $\phi = \frac{1}{2}$, then tan $(\theta + \phi)$ is

(a) $\sqrt{3}$ (b) $\frac{1}{\sqrt{3}}$ (c) 1 (d) not defined

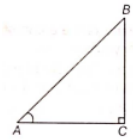
80) If sin $\alpha = \frac{\sqrt{3}}{2}$ and $\cos\beta = \frac{\sqrt{3}}{2}$, then tan α . tan β is

(a) $\sqrt{3}$ (b) $\frac{1}{\sqrt{3}}$ (c) 1 (d) 0

81) If tan θ = 5/12, then the value of $\frac{\sin\theta+\cos\theta}{\sin\theta-\cos\theta}$ is

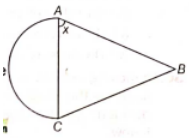
(a) -17/7 (b) 17/7 (c) 17/13 (d) -7/13

82) In ΔABC, ∠C is right angle. If tan A = 8/7 then find the value of cot B.



(a) 7/8 (b) 8/7 (c) $7/\sqrt{113}$ (d) $8/\sqrt{113}$

83) ΔABC is an isosceles triangle, with AB = BC.A semicircle of the area equal to that of the triangle is combined with it What is the value of tan x?



(a) 1 (b) 1/4 π (c) 1/2 π (d) π

84) $\frac{2\tan 30^\circ}{1+\tan^2 30^\circ}$ is equal to

(a) sin 60° (b) cos 60° (c) tan 60° (d) Sin 30°

85) If $\sin\theta - \cos\theta = 0$, then the value of θ is

(a) 30° (b) 45° (c) 90° (d) 0°

86) If θ is an acute angle and $\tan\theta + \cot\theta = 2$, then the value of $\sin^3\theta + \cos^3\theta$ is

(a) 1 (b) $\frac{1}{2}$ (c) $\frac{\sqrt{2}}{2}$ (d) $\sqrt{2}$

87) The value of ($\tan^2 45° - \cos^2 60°$) is

(a) 1/2 (b) 1/4 (c) 3/2 (d) 3/4

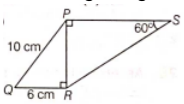
88) If cot θ = 1/√3, the value of $\sec^2\theta + \text{cosec}^2\theta$ is

(a) 1 (b) 40/9 (c) 38/9 (d) $5\frac{1}{3}$

89) In a right-angled ΔPQR, ∠Q=90°. If ∠P=45°, then value of tan P - $\cos^2$ R is

(a) 0 (b) 1 (c) 1/2 (d) 3/2

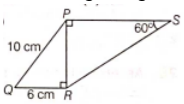
90) In the figure given below, PQRS is a quadrilateral. PR is perpendicular to QR and PS



Based on the above information, answer the following questions.
What is the value of tan Q?

(a) 3/5 (b) 1/2 (c) 1 (d) 4/3

91) In the figure given below, PQRS is a quadrilateral. PR is perpendicular to QR and PS



Based on the above information, answer the following questions.
What is the length of RS?

(a) 8 units (b) 10 units (c) 8 √2 units (d) 16/3 √3 units

92) ($\cos^4$ A - $\sin^4$ A) on simplified form, gives

(a) 2 $\sin^2$ A - 1 (b) 2 $\sin^2$ A + 1 (c) 2 $\cos^2$ A + 1 (d) 2 $\cos^2$ A - 1

93) 1 - $\cos^2$ A is equal to

(a) $\sin^2$ A (b) $\tan^2$ A (c) 1 - $\sin^2$ A (d) $\sec^2$ A

94) If sec θ - tan θ = 1/3, then the value of (secθ + tanθ) is

(a) 4/3 (b) 2/3 (c) 1/3 (d) 3

95) If $\sin\theta = \frac{3}{4}$, then $\frac{(\sec^2\theta - 1)\cos^2\theta}{\sin\theta}$ equals

(a) 3/5 (b) 3/4 (c) 4/3 (d) 9/10

96) If $\sec\theta + \tan\theta = \alpha$ then $\tan\theta$ is

(a) $\frac{p^2+1}{2p}$ (b) $\frac{p^2-1}{2p}$ (c) $\frac{p^2-1}{p^2+1}$ (d) $\frac{p^2+1}{p^2-1}$

Fill up / 1 Marks 5 x 1 = 5

97) The maximum value of sin A is _____

98) The value of $\frac{\cos 45^\circ}{\sec 30^\circ + \operatorname{cosec} 30^\circ}$ is _____

99) The value of $\sin^2\theta + \sin^2(90^\circ - \theta)$ is_____

100) sec A (1- sin A)(sec A + tan A) = _____

101) If cot A = $\sqrt{3}$ then $\sec^2 A - \cos^2 A$ is equal to _____

True or False 7 x 1 = 7

102) cos (A + B) = cos A + cos B

(a) True (b) False

103) tan θ = cot θ for all values of θ .

(a) True (b) False

104) tan (A - B) = tan A - tan B.

(a) True (b) False

105) If sec θ + tan θ = p then secθ - tan $\theta = \frac{1}{p}$.

(a) True (b) False

106) If cos(81° + θ) = sin $\left(\frac{k}{3} - \theta\right)$ then k = 27°.

(a) True (b) False

107) $\tan^2\theta + \cot^2\theta = \sec^2\theta + \operatorname{cosec}^2\theta$

(a) True (b) False

108) If tan A = cot B, then A + B = 60°.

(a) True (b) False

Match the following 4 x 1 = 4

109) $\cos^2\theta - \sin^2\theta$	(1) $\frac{1}{\sqrt{3}}$
110) sec θ + tanθ	(2) $\frac{\sqrt{3}}{2}$
111) cot 2θ	(3) $\sqrt{3}$
112) $\sqrt{3}\left(1 - 2\sin^2\theta\right)$	(4) $\frac{1}{2}$

Assertion and reason 4 x 1 = 4

113) **Assertion** The equation $\sec^2\theta = \frac{4xy}{(x+y)^2}$ is only possible, when x = y.

Reason $\sec^2\theta \geq 1$ and therefore $(x-y)^2 \leq 0$

Codes:

(a) If both Assertion and Reason are correct and Reason is the correct explanation of Assertion.

(b) If both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion.

(c) If Assertion is correct but Reason is Incorrect.

(d) If Assertion is incorrect but Reason is correct.

114) **Assertion** In right triangle ABC and DEF$(\angle C = \angle F = 90^\circ)$, $\angle B$ and $\angle E$ are acute angles, such that sin B = sin E, then $\angle B = \angle E$
Reason $\Delta ABC \sim \Delta DEF$
Codes:
(a) If both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
(b) If both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion.
(c) If Assertion is correct but Reason is Incorrect.
(d) If Assertion is incorrect but Reason is correct

115) **Assertion** $\cos^2$ A - $\sin^2$ A = 1 is a trigonometric identity.
Reason An equation involving trigonometric ratios of an angle is called trigonometric identity, if it is true for all values of the angles involved.
Codes:
(a) If both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
(b) If both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion.
(c) If Assertion is correct but Reason is Incorrect.
(d) If Assertion is incorrect but Reason is correct

116) Assertion : For $0^\circ < \theta \leq 90^\circ$, cosec θ - cot θ and cosec θ + cot θ are reciprocal of each other
Reason : cosec θ - $\cot^2$ θ =1
(a) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
(c) Assertion is correct but Reason is incorrect.
(d) Assertion is incorrect but Reason is correct.

2 Marks 202 x 2 = 404

117) Prove that $\frac{\cot A - \cos A}{\cot A + \cos A} = \frac{\operatorname{cosec} A - 1}{\operatorname{cosec} A + 1}$

118) Given that $\sin\alpha = \frac{1}{2}$ and $\cos\beta = \frac{1}{2}$, what is the value of $(\alpha + \beta)$?

119) If $7\tan\theta = 4$, then find the value of $\frac{7\sin\theta - 3\cos\theta}{7\sin\theta - 3\cos\theta}$

120) If $4x = cosec\theta$ and $\frac{4}{x} = \cot\theta$ find the value of $4\left[x^2 - \frac{1}{x^2}\right]$.

121) Find an acute angle θ, when $\frac{\cos\theta - \sin\theta}{\cos\theta + \sin\theta} = \frac{1-\sqrt{3}}{1-\sqrt{3}}$.

122) If $\tan\theta = \cot(30^0 + \theta)$, find the value of θ.

123) If $\cos 9\alpha = \sin\alpha$ and $9\alpha < 90^0$, find the value of $\tan 5\alpha$.

124) Prove $(\tan\theta + 2)(2\tan\theta + 1) = 5\tan\theta + 2\sec^2\theta$.

125) Prove that $\frac{\sin\theta - 2\sin^2\theta}{2\cos^2\theta - \cos\theta} = \tan\theta$.

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

127) If $\cot\theta = \frac{15}{8}$, find the value of $\frac{(2+2\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(2-2\cos\theta)}$.

128) Find the value of $\left[\frac{\sin^2 22^0 + \sin^2 68^0}{\cos^2 22^0 + \cos^2 68^0} + \sin^2 63^0 + \sin 27^0 \cos 63^0\right]$.

129) Find the value of $(\tan 2^0 \tan 4^0 \tan 6^0 \ldots . \tan 88^0)$.

130) If $\cos A + \cos^2 A = 1$, find the value of $\sin^2 A + \sin^4 A$.

131) If $\sin A + \sin^2 A = 1$, find the value of $\cos^2 A + \cos^4 A$.

132) If $\tan A = \sqrt{2} - 1$, prove that $\frac{\tan A}{1 + \tan^2 A} = \frac{\sqrt{2}}{4}$.

133) If $\tan\theta = \frac{1}{\sqrt{3}}$, evaluate $\frac{cosec^2\theta - \sec^2\theta}{cosec^2\theta + \sec^2\theta}$.

134) If $\sin^2\theta - \cos^2\theta = 2$, find the value of θ

135) If $A + B = 90^0$, prove that $\sqrt{\frac{\tan A \tan B + \tan A \cot B}{\sin A \sec B} - \frac{\sin^2 A}{\cos^2 A}} = \tan A.$

136) Prove that $\frac{\sin\theta}{1-\cos\theta} = cosec\theta + \cot\theta$

137) If $\sec^2\theta = x + \frac{1}{4x}$, find the value of $\sec\theta + \tan\theta$.

138) Prove that $\sqrt{\sec^2\theta + cosec^2\theta} = \tan\theta + \cot\theta$.

139) Eliminate θ from the following equation. $x = a\sec\theta, y = b\tan\theta$

140) Eliminate θ from the following equation. $x = k + a\cos\theta, y = h + b\sin\theta$

141) If $\sin\theta_1 + \sin\theta_2 + \sin\theta_3 = 3, 0^0 < \theta_1, \theta_2, \theta_3 \leq 90^0$, find the value of $\cos\theta_1 + \cos\theta_2 + \cos\theta_3$.

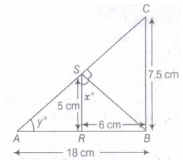
142) If $\sqrt{3}\tan\theta = 3\sin\theta$, then find the value of $\sin^2\theta - \cos^2\theta$.

143) Evaluate $\frac{\cot(90^0-\theta)\sin(90^0-\theta)}{\sin\theta} + \frac{\cot 40^0}{\tan 50^0} - (\cos^2 20^0 + \cos^2 70^0)$

144) Using the formula, $\cos A = \sqrt{\frac{1+\cos 2A}{2}}$, find the value of $\cos 15^0$

145) If $\sqrt{3}\cot^2\theta - 4\cot\theta + \sqrt{3} = 0$, find the value of the $\tan^2\theta + \cot^2\theta$.

146) In the given figure, $\triangle ABC$, is the right angles at B. $\triangle BSC$ is right angles at S and BC = 7.5 cm, RS = 5 cm, RB = 6 cm $\angle BSR = x^0$ and $\angle SAB = y^0$. Find



(i) tan x^0
(ii) sin y
(ii) cos y^0

147) In right angled $\triangle ACB, \angle C = 90^0$, $AB = 29$ units and BC = 21 units. If $\angle ABC = \theta$, find,
$\cos^2\theta - \sin^2\theta \quad and \quad \sin^2\theta + \cos^2\theta.$

148) In a triangle ABC, write $\cos\left(\frac{B+C}{2}\right)$ in terms of angle A.

149) If $\sin\alpha = \frac{1}{2}$ then find the value of $3\sin\alpha - 4\sin^3\alpha$

150) If $\sec\theta . \sin\theta = 0$, then find the value of θ

151) If A + B = 90° and $\sec A = \frac{5}{3}$, then find the value of cosec B.

152) If tan 2A = cot (A + 60), find the value of A where 2A is an acute angle.

153) Find the value of $\frac{\sin 25^\circ}{\cos 65^\circ} + \frac{\tan 23^\circ}{\cot 67^\circ}$

154) If cos 2A = sin (A - 15), find A.

155) If tan (3x + 30°) = 1, then find the value of x.

156) What happens to value of $\cos\theta$ when θ increases from 0° to 90°?

157) Find the value of $\tan^2 10^\circ - \cot^2 80^\circ$.

158) If A and B are acute angles and cosec A = sec B, then find the value of A + B.

159) Find the value of cot 10°. cot 30°. cot 80°

160) Evaluate
$\frac{3\tan^2 30^\circ + \tan^2 60^\circ + cosec 30^\circ - \tan 45^\circ}{\cot^2 45^\circ}$

161) Find cosec 30° and cos 60° geometrically.

162) Evaluate : $\frac{cosec 13^\circ}{\sec 77^\circ} - \frac{\cot 20^\circ}{\tan 70^\circ}$

163) Evaluate : $\frac{\sin 90^\circ}{\cos 45^\circ} + \frac{1}{cosec 30^\circ}$

164) If $\sin(36+\theta)^\circ = \cos(16+\theta)^\circ$, then find θ, where $(36+\theta)^\circ$ and $(16+\theta)^\circ$ are both acute angles.

165) If $\sqrt{2}\sin\theta = 1$, find the value of $\sec^2\theta - cosec^2\theta$

166) If 4 cos θ = 11 sin θ, find the value of $\frac{11\cos\theta - 7\sin\theta}{11\cos\theta + 7\sin\theta}$

167) If $\cos(A-B) = \frac{\sqrt{3}}{2}$ and $\sin(A+B) = \frac{\sqrt{3}}{2}$, find A and B, where (A + B) and (A - B) are acute angles.

168) Express cos 68° + tan 76° in terms of the angles between 0° and 45°.

169) Find the value of cos 2θ , if $2sin2\theta = \sqrt{3}$

170) Find the value of : sin 30° . cos 60° + cos 30° . sin 60° Is it equal to sin 90° or cos 90° ?

171) Evaluate : $\frac{6\sin 23^\circ + \sec 79^\circ + 3\tan 48^\circ}{cosec 11^\circ + 3\cot 42^\circ + 6\cos 67^\circ}$

172) If $\sqrt{3}\sin\theta - \cos\theta = 0$ and $0^\circ < \theta < 90^\circ$, find the value of θ

173) Evaluate : $\frac{\cos 45^\circ}{\sec 30^\circ} + \frac{1}{\sec 60^\circ}$

174) In the given figure, AOB is a diameter of circle with centre O. Find tan A tan B.

175) If $\sin\phi = \frac{1}{2}$, show that $3\cos\phi - 4\cos^3\phi = 0$

176) If $k+1 = \sec^2\theta(1+\sin\theta)(1-\sin\theta)$, then find the value of k.

177) Find the value of $\sin^2 41° + \sin^2 49°$.

178) Express the trigonometric ratio of sec A and tan A in terms of sin A.

179) Prove that : $\frac{(\sin^4\theta + \cos^4\theta)}{1 - 2\sin^2\theta\cos^2\theta} = 1$

180) Prove that : $\sec^4\theta - \sec^2\theta = \tan^4\theta + \tan^2\theta$

181) Find the value of θ, if,
$\frac{\cos\theta}{1-\sin\theta} + \frac{\cos\theta}{1+\sin\theta} = 4; \theta \leq 90^\circ$

182) Prove that : $-1 + \frac{\sin A \sin(90^\circ - A)}{\cot(90^\circ - A)} = -\sin^2 A$

183) A ladder 15 m long lean against a wall making an angle of 60° with the wall. Find the height of the point where the ladder touches the wall.

184) A ladder, leaning against a wall, makes an angle of 60° with the horizontal. If the foot of the ladder is 2.5 m away from the wall, find the length of the ladder.

185) A Pole casts a shadow of length 2√3 m on the ground, when the Sun's elevation is 60°. Find the height of the pole.

186) If the length of the ladder placed against a wall is twice the distance between the foot of the ladder and the wall. Find the angle made by the ladder with the horizontal.

187) An observer, 1.7 m tall, is 20.J3 m away from a tower.The angle of elevation from the eye of observer to the top of tower is.30°. Find the height of tower

188) Prove that : $\sqrt{\frac{1-\cos A}{1+\cos A}} = cosecA - \cot A$

189) If $\sin\theta - \cos\theta = \frac{1}{2}$, then find the value of $\sin\theta + \cos\theta$

190) If θ be an acute angle and 5cosec θ = 7, then evaluate $\sin\theta + \cos^2\theta - 1$

191) If $\sin A = \frac{\sqrt{3}}{2}$, find the value of $2\cot^2 A - 1$

192) An observer 1.2 metere tall is 28.2 m away from the tower.The angle of elevation of the top of the tower from his eye is 60°.What is the height of the tower?

193) In figure, a tower AB is 20 m high and BC, its shadow on the ground, is $20\sqrt{3}$ m long. Find the Sun's altitude.

194) In the given figure, AB is a 6 m high pole and B is a ladder inclined at an angle of 60° to the horizontal and reaches up' to point D of pole. If AD = 2.54 m, find the length of the ladder,

195) An observer 1.5 m tall is 28.5 m away from a tower 30 m high. Find the angle of elevation of the top of the tower from his eye.

196) If the angles of elevation of the top of a tower from two points distant a and b (a > b) from its foot and in the same straight line from it are respectively 30° and 60°, then find the height of the tower.

197) A ladder makes an angle of 60° with the ground when placed against a wall. If the foot of ladder is 2m away from the wall, find the length of ladder

198) The angle of depression of a car parked on the road from the top of a 150 m high tower is 30°.Find the distance of the car from the tower (in m).

199) The length of shadow of an object is greater than the height of the object, then what is the angle of elevation?

200) In the given figure, if AD = 7√3rn, then find the value of BC

201) The ratio of the length of a rod and its shadow is $1 : \frac{1}{\sqrt{3}}$.What is the angle of elevation of the source of light?

202) The height of a tower is 100m. When the angle of elevation of the Sun is 30°, then what will be the length of shadow of the tower?

203) The top of two poles of height 16m and 10 mare connected by a wire of length l metre.If wire makes an angle of 30° with the horizontal, then find l.

204) The length of the shadow of a vertical pole is √3 times its height, find the Sun's altitude

205) A pole 6 m high casts a shadow 2√3 m long on the ground, then find the Sun's elevation.

206) Find the length of kite string flying at 100 m above the ground with the elevation of 60^0

207) In given figure, if AB = 4 m and AC = 8 rn, then find the angle of elevation of A as observed from C.

208) Find the angle of elevation of the top of the tower from the point on the ground which is 30 m away from the foot of the tower of height 10 √3 rn.

209) What is the angle formed by the line of sight with the horizontal, when the point being viewed is above the horizontal level?

210) If the altitude of the Sun is 60°, what is the height of a tower which casts a shadow of length 30m?

211) From the top of light house, 40 m above the later, the angle of depression of a small boat is 60°. Find how far the boat is from the base of the light house.

212) A kite is flying at a height of 90 m above the ground.The string attached to the kite is temporarily tied to a point on the ground.The inclination of the string with the ground is 60°.Find the length of the string assuming that there is no slack in the string.

213) A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle 30°with it. The distance between the foot of the tree to the point where the top touches the ground is 8m.Find the height of the tree.

214) If the shadow of a tower is 30 m long, when the Sun's elevation is 30°. What is the length of the shadow, when Sun's elevation is 60°?

215) From a point P on the ground the angle of elevation of the top of a 10 m tall building is 30°. A flag is hoisted at the top of the building and the angle of elevation of the top of the flagstaff from P is 45°. Fin~ the length of the flagstaff and distance of building form point P.

216) The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 45°.If the tower is 30m high, find the height of the building.

217) A player sitting on the top ofa tower of height 20m observes the angle of depression of a ball lying on the ground as 60°. Find the distance between the foot of the tower and the ball.

218) Evaluate: $\frac{tan^2 60^\circ + 4sin^2 45^\circ + 3sec^2 30^\circ + 5cos^2 90^\circ}{cosec 30^\circ + sec 60^\circ - cot^2 30^\circ}$

219) If $\frac{cos\alpha}{cos\beta} = m$ and , show that $\frac{cos\alpha}{sin\beta} = n$ show that ($m^2 + n^2$) $\cos^2\beta = n^2$

220) In a ΔABC, right angled at C, if tanA = $\frac{1}{\sqrt{3}}$ and tanB = $\sqrt{3}$, show that sinAcosB+cosAsinB=1

221) Prove that : (1 + cot A + tan A) (sin A - cos A)= $\frac{secA}{cosec^2 A} - \frac{cosecA}{sec^2 A}$

222) If tan A = $\frac{1}{2}$ and tanB = $\frac{1}{3}$, by using tan(A + B)= $\frac{tanA + tanB}{1 - tanA tanB}$, prove that A + B = 45^0

223) Evaluate $\frac{\tan 65^\circ}{\cot 25^\circ}$

224) Express cot 85° + cos 75° in terms of trigonometric ratios of angles between 0° and 45°.

225) Evaluate : $\frac{\sin 18^\circ}{\cos 72^\circ}$

226) Evaluate : $\frac{\tan 26^\circ}{\cot 64^\circ}$

227) Evaluate : cos 48° – sin 42°

228) Evaluate : cosec 31° – sec 59°

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

230) If tan A = cot B, prove that A + B = 90°.

231) In the following, one of the six trigonometric ratios is given. Find the values of the other trigonometric ratios $\sin A = \frac{12}{13}$

232) In the following, one of the six trigonometric ratios is given. Find the values of the other trigonometric ratios $\tan\theta = \frac{a}{b}$

233) In the following, one of the six trigonometric ratios is given. Find the values of the other trigonometric ratios $\sin A = \frac{3}{5}$

234) In the following, one of the six trigonometric ratios is given. Find the values of the other trigonometric ratios $\cot A = \frac{8}{15}$

235) Given, sin A = $\frac{3}{5}$ find the other trigonometric ratios of the angle A.

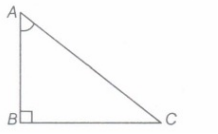
236) Given, 15 cot A = 8, find the other trigonometric ratios of the ∠A.

237) If sin $\theta = \frac{24}{25}$ thsn find the value of $\sin^2\theta + \cos^2\theta$

238) If sin $A = \frac{3}{5}$ then find the value of sin A cos B + cos A sin B, where angle C is 90°.

239) In a △ABC, ∠B = 90°. If AB = 2 cm and AG = 3 cm, find the value of sin A

240) In the following figure, △ABC is right angled at B, BG = 4 cm, AB = 3 cm, then determine sin A, cos A



241) If 3 tan A = 4 sin A, then find the relation between cosec A and cot A.

242) In a ∠PQR, ∠Q = 90°. If PQ = 10 cm and PR = 15 cm. Then find the value of $\tan^2$ P + $\sec^2$ P + 1

243) If 22cos A - 3sin A = 20sin A, then find the value of $\tan^2$ A +$\sin^2$ A· $\sec^2$ A.

244) If cos $\theta = \frac{2}{3}$ find the value of 2 $\sec^2\theta$ + 2 tan θ - 9.

245) In a△ABC, right angled at B, having AB = 5 cm, and BC = 12 cm, find sin A, cos C and tan A.

246) If $\sqrt{3}$ sin θ = cos θ , find the value of $\frac{\sin\theta\tan\theta(1+\cot\theta)}{\sin\theta+\cos\theta}$

247) If 2 cos 3θ =.$\sqrt{3}$, find the value of θ

248) If sin x + cos y = 1,x = 30° and y is an acute angle, find the value of y.

249) Find the value of $\sin^2 30^o + \cos^2 45^o + \cos^2 30^o$.

250) Find the value of
4 tan 45°+$\sqrt{3}$ cot 60°+3 $\sin^2$ 60°+ tan 30°cot 45°

251) Find the value of 3 sin 30° - 4 $\sin^3$ 60°.

252) If tan $A + \sin^2 45^\circ - \cos^2 30^\circ - \operatorname{cosec}^2 45^\circ \sec^2 60^\circ = 4$ then find tan A.

253) Find the value of x in each of the following
x tan 45 °cos 60° = sin 60° cot 60°

254) Find the value of x in each of the following
-x sin 90° cos 30°+ sin 30° cos 90° = $\frac{4}{5}$

255) Find the value of x in each of the following
cos 2x = cos 60°cos 30°+ sin 60°sin 30°

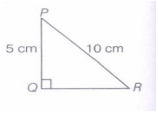
256) Find the value of : 3 $\tan^2\theta$ + 2 sin θ cos B, for θ = 45°

257) Find the value of : cosec^2 A - 2 sin A + tan A cos A + 5, for A = 60°.

258) If sin θ - cos θ = 0, (0 $\leq \theta \leq$ 90°), find the value of θ .

259) If sin (A + B) = 1 and cos (A - B) $= \frac{\sqrt{3}}{2}$ find the values of A and B.

260) In the following figure, MQR is right angled at Q, PQ = 5 crn , PR = 10 cm. Determine $\angle$ QPR and $\angle$PRQ.



261) Evaluate
$\frac{\sin 36^\circ}{\cos 54^\circ}$

262) Evaluate
$\frac{\cot 18^\circ}{\tan 72^\circ}$

263) Evaluate
$\frac{\sec 81^\circ}{\operatorname{cosec} 9^\circ}$

264) Evaluate
$\frac{\sin 67^\circ \cot 23^\circ}{\tan 67^\circ \cos 23^\circ}$

265) Evaluate
$1 - \frac{\operatorname{cosec} 1^\circ \sec 1^\circ}{\operatorname{cosec} 89^\circ \sec 89^\circ}$

266) Evaluate
$\frac{\sin^2 15^\circ}{\cos^2 75^\circ}$

267) Evaluate cos 15° - sin 75°

268) Evaluate sec 49° - cosec 41 °

269) Evaluate cot 25° - tan 65°+ 2

270) Evaluate 4cos 36° - 4sin 54°- 4

271) Evaluate sin 17° sin 3° sin 1°sec 73° sec 87° sec 89°

272) Evaluate cosec 22° cosec 62°cos 28°cos 68°

273) Express each of the following in terms of the trigonometric ratio of angles lying between 0^0 and 45^0 .
tan 80^0 + cot 70^0

274) If sec 5A = cosec (A + 60°), where 5 A is an acute angle then find the value of A.

275) Express each of the following in terms of trigonometric ratio of angles lying between 0° and 45°.
cosec 75° + sec 68°

276) Express each of the following in terms of trigonometric ratio of angles lying between 0° and 45°.
sin 73° + cosec 89°

277) Show that $\sqrt{(1-\cos^2\theta)\sec^2\theta} = \tan\theta$

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

279) If $\frac{\cot A}{1+\operatorname{coset} A} - \frac{\cot A}{1-\operatorname{cosec} A} = \frac{K}{\cos A}$, then find the value of K.

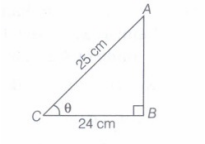
280) What is the value of ($\cos^2$ 67°-$\sin^2$ 23°)?

281) Find the value of(cos 48° - sin 42°).

282) If tan θ = cot (30° + θ), find the value of θ .

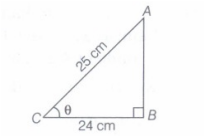
283) If cos 9 α = sin α and value of tan 5 α is 9 α < 90°, then the

284) With the help of following figure, find the value of



$\sec^2\theta$ + $\tan^2\theta$

285) With the help of following figure, find the value of



$\operatorname{cosec}^2\theta$ - $\cot^2\theta$

286) If tan θ = 1 and sin $\phi = \frac{1}{\sqrt{2}}$ find the value of cos $(\theta + \phi)$,where θ and ϕ are both acute angles.

287) If tan $\theta = \frac{20}{21}$ then prove that $\frac{1-\sin\theta+\cos\theta}{1+\sin\theta+\cos\theta} = \frac{3}{7}$

288) Show that $\frac{\sin\theta}{\operatorname{cosec}\theta-1} + \frac{\cos\theta}{1+\sec\theta} = \frac{\sin\theta\cos\theta}{(\sin\theta-\cos\theta)}$

289) Show that 2 ($\cos^2$ 60°+ $\sin^4$ 30°) - ($\tan^2$ 60° + $\cot^2$ 45°)+ 3 $\sec^2$ 30° $= \frac{1}{4}$

290) Two famous bowlers of Indian Cricket team Navdeep Saini and Jaspreet Bumrah throw a ball at an angle of A and Brespectively in such a way that sin $(A-B) = \frac{1}{2}$ and cos \(\cos (A+B)=0,0^{\circ}B\)
(i) Find the angles of both bowlers at whieh they throw a ball.
(ii) Find the values of the following trigonometric ratios tan A. cosec(A - B), sec B.

291) Prove that $\frac{\operatorname{cosec}\theta}{1+\sec\theta} + \frac{1+\sec\theta}{\operatorname{cosec}\theta} = 2\operatorname{cosec}^3\theta[\sec\theta - 1]$

292) If $\sin^6$ A + $\cos^6$ A + 3 $\sin^2\theta$ $\cos^2\theta$ + 4 = k, then find the value of k.

293) Suppose $\sin\theta_1 + \sin\theta_2 + \sin\theta_3 = 3$,$0^\circ < \theta_1, \theta_2, \theta_3 \leq 90^\circ$
(i) Find the value of $\cos\theta_1 + \cos\theta_2 + \cos\theta_3$
(ii) Calculate the value of tan $(225^\circ - \theta_1 - \theta_2)$
(iii) Evaluate sin $(120^\circ - \theta_3)$

294) If m sin θ + n cos θ = p and m cos θ - n sin θ = q, Prove that $m^2 + n^2 = p^2 + q^2$.

295) Prove that $\frac{\sin\theta}{\cot\theta+\operatorname{cosec}\theta} = 2 + \frac{\sin\theta}{\cot\theta-\operatorname{cosec}\theta}$

296) If 7 $\sin^2$ A + 3 $\cos^2$ A = 4, prove that $\tan A = \frac{1}{\sqrt{3}}$.

297) If cos θ + sin θ = $\sqrt{2}$ cos θ, prove that cosθ - sin θ =$\sqrt{2}$ sin θ.

298) Ram was trying hard to prove $a\cos\theta - b\sin\theta = \pm\sqrt{a^2+b^2-c^2}$ a sin θ + b cos θ = c.Her classmate Swati gave her a hint of squaring both sides of sin θ + b cos θ = c and proceed further. With her hint, Ram was able to solve the problem and he thanks Swati for this hint. So, write the solution of the above problem.

299) If4 tan θ = 3 evaluate $\left(\frac{4\sin\theta - \cos\theta + 1}{4\sin\theta + \cos\theta - 1}\right)$

300) Evaluate $\sin A\cos A - \frac{\sin A\cos(90^\circ - A)\cos A}{\sec(90^\circ - A)} - \frac{\cos A\sin(90^\circ - A)\sin A}{\operatorname{cosec}(90^\circ - A)}$

301) Calculate A + B when tan A = $\frac{2}{3}$ $\tan B = \frac{3}{2}$ if it is given that $\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A\tan B}$ where, A and B are acute angles.

302) In $\triangle$ ABC, show that $\sin^2\frac{A}{2} + \sin^2\frac{B+C}{2} = 1$

303) If cot $\theta = 3x - \frac{1}{12x}$ show that cot θ + cosec θ = 6x or $-\frac{1}{6x}$

304) If cosec (A - B) = 2, cot (A + B) = $\frac{1}{\sqrt{3}}$, $0^\circ < (A+B) \le 90^\circ, A > B$ find A and B

305) If A, B and C are interior angles of $\triangle$ ABC,show that $\tan^2\left[\frac{B+C}{2}\right] = \operatorname{cosec}^2\frac{A}{2} - 1$

306) Prove that $\frac{1}{(\sec x - \tan x)} - \frac{1}{\cos x} = \frac{1}{\cos x} - \frac{1}{\sec x + \tan x}$

307) Prove that $\sqrt{\frac{\sec A + \tan A}{\sec A - \tan A}} \cdot \sqrt{\frac{\operatorname{cosec} A - 1}{\operatorname{cosec} A + 1}} = 1$

308) If sin θ + 2 cos θ = 1. prove that 2 sin θ - cos θ = 2.

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

310) If 1 + $\sin^2\theta$ = 3 sin θ cos θ, prove that $\tan\theta = 1$ or $\frac{1}{2}$

311) Evaluate 5$\sin^2$45° - sec 60° $\cot^2$ 30°

312) Evaluate $\frac{\cos 45^\circ + \sin 60^\circ}{\sec 30^\circ + \operatorname{cosec} 30^\circ}$

313) Evaluate $\frac{\sec^2 45^\circ - \tan^2 45^\circ}{\sin^2 45^\circ}$

314) Evaluate $\frac{5\tan 60^\circ}{(\sin^2 60^\circ + \cos^2 60^\circ)\tan 30^\circ}$

315) If $\sqrt{3}\tan\theta = 3\sin\theta$, then find the value of $\sin^2\theta - \cos^2\theta$.

316) Evaluate $\sin^2$ 60° + 2tan45°- $\cos^2$ 30°

317) If $\cos A + \cos^2 A = 1$, find the value of $\sin^2 A + \sin^4 A$

318) If $4x = \operatorname{cosec}\theta$ and $\frac{4}{x} = \cot\theta$, find the value of $4\left[x^2 - \frac{1}{x^2}\right]$.

3 Marks 148 x 3 = 444

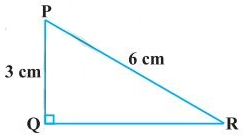
319) If sin (A – B) = $\frac{1}{2}$ cos (A + B) = $\frac{1}{2}$ 0° < A + B $\le$ 90°, A > B, find A and B.

320) Prove that $\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \frac{1}{\sec\theta - \tan\theta}$ using the identity $\sec^2\theta = 1 + \tan^2\theta$.

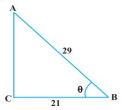
321) Given $\tan A = \frac{4}{3}$, find the other trigonometric ratios of the angle A.

322) In $\triangle$ ABC, right-angled at B, AB = 5 cm and $\angle$ ACB = 30° (see Fig). Determine the lengths of the sides BC and AC.

323) In $\triangle PQR$, right-angles at Q, PQ = 3 cm and PR = 6 cm. Determine $\angle QPR$ and $\angle PRQ$.



324) Consider $\triangle$ ACB, right-angled at C, in which AB = 29 units, BC = 21 units and $\angle$ ABC = θ . Determine the values of



(i) $\text{Cos}^2\,\theta + \sin^2\,\theta$
(ii) $\cos^2\,\theta\theta - \sin^2\,\theta\theta$.

325) In a right triangle ABC, right-angled at B, if tan A = 1, then verify that 2 sin A cos A = 1.

326) In $\triangle$ OPQ, right-angled at P, OP = 7 cm and OQ – PQ = 1 cm . Determine the values of sin Q and cos Q.

327) Evaluate the following : sin 60° cos 30° + sin 30° cos 60°

328) Evaluate the following : $2\tan^2 45° + \cos^2 30° - \sin^2 60°$

329) Evaluate the following $\frac{\cos 45^\circ}{\sec 30^\circ + \text{cosec } 30^\circ}$

330) Evaluate the following $\frac{\sin 30^\circ + \tan 45^\circ - \text{cosec } 60^\circ}{\sec 30^\circ + \cos 60^\circ + \cot 45^\circ}$

331) Evaluate the following $\frac{5\cos^2 60^\circ + 4\sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$

332) Express the ratios cos A, tan A and sec A in terms of sin A.

333) Prove that sec A (1 – sin A) (sec A + tan A) = 1.

334) If $m \cot A = n$, find the value of $\frac{m \sin A - n \cos A}{n \cos A + m \sin A}$

335) Prove that $\frac{cosec^2\theta - \cos^2\theta}{\cot^2\theta} = \sec^2\theta - \sin^2\theta$

336) Evaluate $\cos^2 30^0 + \sin^2 45^0 - \frac{1}{3}\tan^2 60^0$.

337) Find the value of $\frac{\cos 60^0 + \sin 45^0 - \cot 30^0}{\tan 60^0 + \sec 45^0 - cosec 30^0}$.

338) Evaluate $8\sqrt{3} cosec^2 30^0 \sin 60^0 \cos 60^0 cos^2 45^0 \sin 45^0 \tan 30^0 cosec^3 45^0$

339) If $2\cos 3\theta = \sqrt{3}$, find the value of θ .

340) What happens to value of $\tan\theta$ when θ increases from 0^0 to 90^0 ?

341) If $\angle A = \angle B = 45^0$, verify that sin(A + B) = sin A cos B + cos A sin B.

342) If tan (3x + 30^0) = 1, find the value of x.

343) Find acute angles A and B, if sin (A + 2B)= $\frac{\sqrt{3}}{2}$ and cos (A + 4B) = 0^0 , A > B.

344) In a $\triangle ABC$, right angle at B, $\angle A = \angle C$, find the value of sin A cos C + cos A sin C.

345) If A and B are acute angles such that sin A = cos B, prove that (A + B) = 90^0 .

346) Evaluate $\frac{\sin 41^0}{\cos 49^0}$

347) Evaluate $\frac{\tan 29^0}{\cot 61^0}$

348) Evaluate $\frac{cosec 70^0}{\sec 20^0}$

349) Evaluate $\cos 53^0 - \sin 37^0$

350) Evaluate $\tan 42^0 - \cot 48^0$

351) Express cosec 48^0 + tan 88^0 in terms of T- ratios of angles between 0^0 and 45^0 .

352) Evaluate $\frac{\tan 15^0}{\cot 75^0} + \frac{\sin 25^0}{\cos 65^0}$

353) Find the value of $(\tan 1^0 \tan 2^0 \tan 3^0 \ldots \tan 89^0)$.

354) Evaluate $\frac{\tan 50^0 + \sec 50^0}{\cot 40^0 + cosec 40^0} + \cos 40^0 cosec 50^0$

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

356) If sec 5 A = cosec (A + 30^0), find A. where 5 A is an acute angle, then find the value of A.

357) If cos (A - B) = cos A cos B + sin A sin B, find the value of cos 15^0 .

358) Evaluate $\frac{\sin 70^0}{\cos 20^0} + \frac{cosec 36^0}{\sec 54^0} - \frac{2 \cos 43^0 cosec 47^0}{\tan 10^0 \tan 40^0 \tan 50^0 \tan 80^0}$

359) Prove that cot A + tan A = sec A cosec A.

360) Prove the trigonometric identity $\sqrt{\frac{cosecA-1}{cosecA+1}} + \sqrt{\frac{cosecA+1}{cosecA-1}} = 2\ secA$

361) Prove that $\frac{\sin A + \cos A}{\sin A - \cos A} + \frac{\sin A - \cos A}{\sin A + \cos A} = \frac{2}{\sin^2 A - \cos^2 A}$.

362) If $a \cos\theta - b \sin\theta = x$ and $a \sin\theta + b \cos\theta = y$, prove that $a^2 + b^2 = x^2 + y^2$.

363) If $\tan\theta + \sin\theta = m$ and $\tan\theta - \sin\theta = n$,then show that $(m^2-n^2)^2 = 16\ mn$ or $(m^2-n^2) = 4\sqrt{mn}$.

364) Evaluate $\frac{\sec^2(\sin 90^0 - \theta) - \cot^2\theta}{2(\sin^2 25^0 + \sin^2 65^0)} + \frac{2 \cos^2 60^0 \tan^2 28^0 \tan^2 62^0}{\sin^2 30^0 \cos^2 60^0}$

365) Prove that $\cos\theta \sin\theta - \frac{\sin\theta \cos(90^0 - \theta) \cos\theta}{cosec(90^0 - \theta)} - \frac{\cos\theta \sin(90^0 - \theta) \sin\theta}{\sec(90^0 - \theta)} + cosec(90^0 - \theta) = \frac{1}{\cos\theta}$.

366) Prove that $\frac{cosec\theta + cot\theta}{cosec\theta - cot\theta} = 1 + 2cot^2\theta + 2cosec^2\theta cos\theta$

367) If $tan\theta + \frac{1}{tan\theta} = 2$, find the value of $\frac{1}{cot^2\theta} + cot^2\theta$.

368) Without using trigonometric tables, evaluate
$\frac{\sec 39^0}{cosec 51^0} + \frac{2}{\sqrt{3}} \tan 17^0 \tan 38^0 \tan 60^0 \tan 52^0 \tan 73^0 - 3(\sin^2 31^0 + \sin^2 59^0)$.

369) Simplify $\frac{\tan 28^0}{\cot 62^0} \div \frac{1}{\sqrt{3}} [\tan 20^0 . \tan 60^0 . \tan 70^0]$

370) Given that $\tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A . \tan B}$. Evaluate tan 15^0 .

371) If $\sin A = \frac{1}{\sqrt{5}} \quad and \quad \sin B = \frac{1}{\sqrt{10}}$, find the values of cos A and cos B. Hence using the formula cos (A + B) = cos A cos B - sin A sin B, show that A + B + 45^0 .

372) Without using trigonometric tables, evaluate $\left(\frac{3 \cos 43^0}{\sin 47^0}\right)^2 - \frac{\cos 37^0 cosec 53^0}{\tan 5^0 \tan 25^0 \tan 45^0 \tan 65^0 \tan 85^0}$

373) Without using trigonometric tables, evaluate $2\left(\frac{\cos 58^0}{\sin 32^0}\right) - \sqrt{3}\left(\frac{\cos 38^0 cosec 52^0}{\tan 15^0 \tan 60^0 \tan 75^0}\right)$.

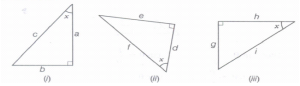
374) Evaluate $\frac{\sec^2(90^0 - \theta) - \cot^2\theta}{2(\sin 25^0 + \sin 65^0)} - \frac{2 \sin 30^0 . \tan 32^0 . \tan 58^0}{2(\sec^2 33^0 - \cot^2 57^0)}$

375) Prove that $sinAcosA - \frac{sinAcos(90^\circ - A)cosA}{sec(90^\circ - A)} - \frac{cosAsin(90^\circ - A)sinA}{cosec(90^\circ - A)}$.

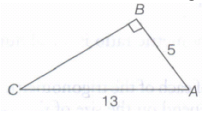
376) Prove that $(1 + tan\ A\ \ tan\ B)^2 + (tanA - tanB)^2 = sec^2 A sec^2 B$

377) If $a \cos\theta - b \sin\theta = c$, prove that $a \sin\theta + b \cos\theta = \pm\sqrt{a^2 + b^2 - c^2}$.

378) Indicate the perpendicular, the hypotenuse and the base (in that order) with respect to the angle marked x.

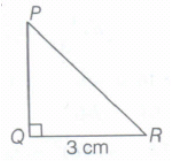


379) From the following figure, find



(i) sin A
(ii) cos C
(iii) tan A
(iv) cosec C.

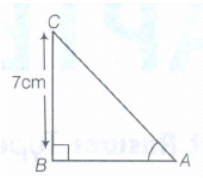
380) In PQR right angled at Q, QR=3 cm and PR-PQ=1cm. Determine the values of sin R, cos R and tan R.



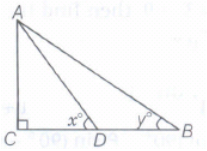
381) In a $\triangle$ ABC, right angles at B, if tan A=1, verify that 2sin A cos A=1.

382) If θ is an acute angle and $3 \sin \theta = 4 \cos \theta$ find the value of $4 \sin^2 \theta - 3 \cos^2 \theta + 2$.

383) In the given figure, ΔABC is a right angled triangle right angled at B. If BC = 7 cm and AC - AB = 1 cm, find the value of sin A + cos A.

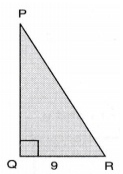


384) In the given figure, if D is the mid-point of BC, find the value of $\frac{tanx^O}{tany^O}$



385) If in a triangle ABC right angled at B, AB = 6 units and BC = 8 units, then find the value of sin A. cos C + cos A.sin C.

386)



In the given $\triangle PQR$, right-angled at Q, QR = 9 cm and PR - PQ = 1 cm. Determine the value of sin R + cos R.

387) Express cos 71° - sin 57° + tan 63° in terms of trigonometric ratios of angles between 0° and 45°.

388) If cos(40° + x) = sin 30°, find the value of x.

389) Evaluate : $\frac{5 \cos^2 60^\circ + 4 \cos^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 60^\circ}$

390) If $\sin 3\theta = \cos (\theta - 6^\circ)$, where 3θ and $\theta - 6^\circ$ are both acute angles, find the value of θ

391) Simplify : $\frac{\sin \theta \sec (90^\circ - \theta) \tan \theta}{cosec(90^\circ - \theta) \cos \theta \cot (90^\circ - \theta)} - \frac{\tan (90^\circ - \theta)}{\cot \theta}$

392) Verify : $\sqrt{\frac{1 - \cos \theta}{1 + \cos \theta}} = \frac{\sin \theta}{1 + \cos \theta}, \quad for \quad \theta = 60^\circ$

393) If tan A + cot A = 2, then find the value of $\tan^2 A + \cot^2 A$.

394) If $\cos\theta + \sin\theta = \sqrt{2}\cos\theta$, show that $\cos\theta - \sin\theta = \sqrt{2}\sin\theta$.

395) Prove that : $\frac{\cos A}{1-\tan A} + \frac{\sin A}{1-\cot A} = \sin A + \cos A$

396) In $\triangle ABC$, $\angle B$ = 90°, BC = 5 cm, AC - AB = 1, Evaluate : $\frac{1+\sin C}{1+\cos C}$

397) Find the value of sin 60° geometrically.

398) Prove that : $\frac{\cos A}{1+\tan A} - \frac{\sin A}{1+\cot A} = \cos A - \sin A$

399) If $b\cos\theta = a$, then prove that $cosec\theta + \cot\theta = \sqrt{\frac{b+a}{b-a}}$

400) Prove that : $\frac{\sin\theta.2\sin^3\theta}{2\cos^3\theta.\cos\theta} = \tan\theta$

401) The tops of two towers of height x and y, standing on level ground, subtend angles of 30° and 60° respectively at the centre of the line joining their feet, then find x: y.

402) When is an equation called 'an identity'. Prove the trigonometric identity 1 + $\tan^2$A = $\sec^2$A.

403) An aeroplane, when 3000m high, passes vertically above another plane at an instant when the angles of elevation of the two aeroplanes from the same point on the ground are 60° and 45° respectively. Find the vertical distance between the two aeroplanes.

404) The shadow of a tower standing on a level ground is found to be 40 m longer when the Sun's altitude is 30°, then when it is 60°. Find the height of the tower.

405) Prove that :$(\cot\theta - cosec\theta)^2 = \frac{1-\cos\theta}{1+\cos\theta}$

406) From the top of a tower of height 50 m, the angles of depression of the top and bottom of a pole are 30° and 45° respectively. Find:
(i) How far the pole is from the bottom of a tower,
(ii) the height of the pole.

407) The angle of elevation of an aeroplane from a point A on the ground is 60°. After a flight of 15 seconds, the angle of elevation change to 30°. If the aeroplane is flying at a constant height of $1500\sqrt{3}$m, find the speed of the plane in km/hr.

408) Prove that : $(cosec\theta - \sin\theta)(\sec\theta - \cos\theta)(\tan\theta + \cot\theta) = 1$

409) The angle of elevation of the top of a tower from two points P and Q at distances of a and b respectively from the base and in the same straight line with it are complementary. Prove that the height of the tower is $\sqrt{ab}$.

410) Show that : $cosec^2\theta - \tan^2(90^\circ - \theta) = \sin^2\theta + \sin^2(90^\circ - \theta)$

411) Prove that : $\frac{cosec^2\theta}{cosec\theta - 1} - \frac{cosec^2\theta}{cosec\theta + 1} = 2\sec^2\theta$

412) A bird sitting on the top of a 80 m high tree. From a point on the ground, the angle of elevation of the bird is 45°. The bird flies away horizontally in such a way that it remained at a constant height from the ground. After 2 seconds, the angle of elevation of the bird from the same point is 30°. Find the speed of flying of the bird.

413) From a point P on the ground, the angle of elevation of the top of a tower is 30° and that of the top of a flag staff fixed on the top of the tower is 60°. If the length of the flag staff is 5 m, find the height of the tower.

414) Prove that : $\frac{1}{cosecA - \cot A} - \frac{1}{\sin A} = \frac{1}{\sin A} - \frac{1}{cosecA - \cot A}$

415) If $\sec\theta = x + \frac{1}{4x}$, prove that $\sec\theta + \tan\theta = 2x$ or $\frac{1}{2x}$

416) At a point A, 20 meters above the level of water in a lake, the angle of elevation of a cloud is 30°.The angle of depression of the reflection of the cloud in the lake, at A is 60°. Find the distance of the cloud from A?

417) Prove that : $\frac{\sin\theta - \cos\theta}{\sin\theta + \cos\theta} + \frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} = \frac{2}{2\sin^2\theta - 1}$

418) The angle of elevation of an aeroplane from a point on the ground is 45°. After 15 seconds of flight the angle changes to 30°. If the plane is flying at a constant height of 2500 m, find the speed of the plane.

419) A person standing on the bank of a river, observes that the angle of elevation of the top of the tree standing on the opposite bank is 60°. When he retreats 20 m from the bank, he finds the angle of elevation to be 30°.Find the height of the tree and the breadth of the river.

420) The angle of elevation of a jet fighter from point A on ground is 60°. After flying 10 seconds, the angle changes to 30°. If the jet is flying at a speed of 648 kin/hour, find the constant height at which the jet is flying.

421) If $x\sin^3\theta + y\cos^3\theta = \sin\theta\cos\theta$ and $x\sin\theta = y\cos\theta$, prove that $x^2 + y^2 = 1$

422) The horizontal distance between two poles is 15 m. The angle of depression of the top of first pole as seen from the top of second pole is 30°. If the height of the first pole is 24 m, find the height of the second pole. [Use $\sqrt{3}$ = 1.732]

423) A boy observes that the angle of elevation of a bird flying at a distance of 100 m is 30°. At the same distance from the boy, a girl finds the angle of elevation of the same bird from a building 20 m high is 45. Find the distance of the bird from the girl.

424) Prove that $\frac{\cos^3\theta+\sin^3\theta}{\cos\theta+\sin\theta} + \frac{\cos^3\theta-\sin^3\theta}{\cos\theta-\sin\theta} = 2$

425) The angle of elevation of the top of a tower from a point A on the ground is 30°. On moving a distance of 20 metre towards the foot of the tower to a point B the angle of elevation increases to 60°.Find the height of the tower and the distance of the tower from the point A.

426) The angle of elevation of a cloud from a point 200 m above the lake is 30° and the angle of depression of its reflection in the lake is 60°, find the height of the cloud above the lake.

427) Evaluate the following : $\frac{\sec^2(90^\circ-\theta)-\cot^2\theta}{2\left(\sin^2 25^\circ+\sin^2 65^\circ\right)} - \frac{2\cos^2 60^\circ\tan^2 28^\circ\tan^2 62^\circ}{3\left(\sec^2 43^\circ-\cot^2 47^\circ\right)}$

428) A pole has to be erected at a point on the boundary of a circular park of the diameter of 13 m in such a way that the differences of its distance form two opposite fixed gates A and B on the boundary is 7 m. Is it possible to do so? If so, at what distance from the pole it is to be erected?

429) A 1.6 m tall girl stands at a distance of 3.2 m from a lamp post and casts a shadow of 4.8 m on the ground. Find the height of the lamp post.

430) Two ships are approaching a light house from opposite directions. The angle of depression of two ships from top of the light house are 30° and 45°. If the distance between two ships is 100 m., find the height of light-house.

431) The angle of elevation of the top of a hill at the foot of a tower is 60° and the angle of elevation of the top of the tower from the foot of the hill is 30°. If the tower is 50 m high, find the height of the hill.

432) Evaluate : $\frac{\sec 41^\circ\sin 49^\circ+\cos 29^\circ cosec 61^\circ-\frac{2}{\sqrt{3}}(\tan 20^\circ\tan 60^\circ\tan 70^\circ)}{2\left(\sin^2 31^\circ+\sin^2 59^\circ\right)}$

433) The angles of depression of the top and bottom of an 8 m tall building from top of a multi-storeyed building are 30° and 45°, respectively. Find the height of multi-storeyed building and distance between two buildings.

434) Evaluate : $\frac{\cos^2(45^\circ+\theta)+\cos^2(45^\circ-\theta)}{\tan(60^\circ+\theta)\tan(30^\circ-\theta)} + cosec\,(75^\circ+\theta) - \sec(15^\circ-\theta)$

435) A person observed the angle of elevation of the top of a tower as 30°.He walked 50m towards the foot of t ower along level ground and found the angle of elevation of the top of the tower as 60°.Find the height of the tower.

436) Express ; sin A, tan A and cosec A in terms of sec A.

437) From a top of a building 100 m high the angle of depression of two objects are on the same side observed to be 45° and 60°. Find the distance between the objects.

438) A boy, flying a kite with a string of 90 m long, which is making an angle El with the ground. Find the height of the kite. $\left(Given \quad tan\theta = \frac{15}{8}\right)$

439) An electric pole is 10 m high. A steel wire tied to top of the pole is affixed at a point on the ground to keep the pole up right. If the wire makes an angles of 45° with the horizontal through the foot of the pole, find the length of the wire [Use √2= 1.414]

440) The angles of depression of the top and bottom of a 50 m high building from the top of a tower are 45° and 60° respectively. Find the height of the tower and the horizontal distance between the tower and the building. (Use √3 = 1.73)

441) An aeroplane, when flying at a height of 4000m from the ground passes vertically above another aeroplane at an instant when the angles of elevation of the two planes from the same point on the ground are 60°and 45° respectively.Find the vertical distance between the aeroplanes at that instant. (Take √3 = 1.73)

442) A 7 m long flagstaff is fixed on the top of a tower standing on the horizontal plane. From point on the ground, the angles of elevation of the top and bottom of the flagstaff are 60° and 45° respectively. Find the height of the tower correct to one place of decimal.

443) Two men on either side of a 75 m high building and in line with base of building observe the angles of elevation of the top of the building as 30° and 60°. Find the distance between the two men.(Use √3 = 1.73).

444) The horizontal distance between two towers is 60 m. The angle of elevation of the top of the taller tower as seen from the top of the shorter one is 30°. If the height of the taller tower is 150 m, them find the height of the shorter tower.

445) The angle of elevation of an aeroplane from a point on the ground is 60°. After a flight of 30 seconds the angle of elevation becomes 30°.If the aeroplane is flying at a constant height of 3000 √3 m, find the speed of the aeroplane.

446) A statue 1.6m tall stands on the top of a pedestal. From a point on the ground the angle of elevation of the top of the statue is 60° and from the same point the angle of elevation of the top of the pedestal is 45°. Find the height of the pedestal.

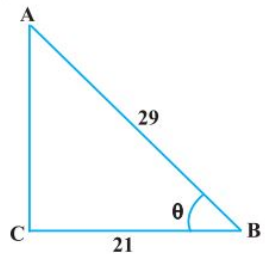
447) Find the value of the following without using trigonometric tables :

$\frac{\cos 50^\circ}{2 \sin 40^\circ} + \frac{4(cosec^2 59^\circ - \tan^2 31^\circ)}{3 \tan^2 45^\circ} - \frac{2}{3}\tan 12^\circ \tan 78^\circ . \sin 90^\circ$

448) Two men standing on opposite sides of a tower measure the angles of elevation of the top of the tower as 30° and 60° respectivity. If the height of the tower is 20 m, then find the distance between the two men.

449) Two poles of equal heights are standing opposite to each other on either side of a road, which is 80 m wide. From a point between them on the road, angles of elevation of their top are 30° and 60°. Find the height of the poles and distance of point from poles.

450) Consider △ ACB, right-angled at C, in which AB = 29 units, BC = 21 units and ∠ ABC = q . Determine the values of



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

451) Evaluate : sin 25° cos 65° + cos 25° sin 65°

452) Evaluate : $\frac{\sin^2 63^\circ + \sin^2 27^\circ}{\cos^2 17^\circ + \cos^2 73^\circ}$

453) Prove that (1 + tan A + cos A) (sin A - cos A) = sin A tan A - cot A cos A.

454) If sec $\theta = \frac{4}{\sqrt{7}}$ then prove that $\sqrt{\frac{2\tan^2\theta - \text{cosec}^2\theta}{2\cos^2\theta - \cot^2\theta}} = \frac{20}{7}$

455) State whether the following are true or false. Justify your answer.
(i) The value of tan A is always greater than 1
(ii) sec A = $= \frac{4}{3}$ for some value of ∠ A.
(iii) sin A is the product of sin and A.
(iv) sin $\theta = \frac{12}{5}$ for some ∠ θ

456) In a $\triangle ABC$, right angle at B, $\angle A = \angle C$, find the value of
sin A sin B + cos A cos B.

457) If cos (A - B) = cos A cos B + sin A sin B, find the value of sin 75^0 .

458) Find the value of $\frac{\cot 40^\circ}{\tan 50^\circ} - \frac{\cos 35^\circ}{2\sin 55^\circ}$

459) If 4x tan15° cot 36°cot 54° tan 75° = 36, then find the value of x.

460) Express the trigonometric ratios cos A, cot A and cosecA in terms of tan A.

461) If $\cos A = \frac{5}{13}$, then verify that $\frac{\cos A}{1-\tan A} + \frac{\sin A}{1-\cot A} = \cos A + \sin A$

462) Prove that $\frac{\sin A+\cos A}{\sin A-\cos A} + \frac{\sin A-\cos A}{\sin A+\cos A} = \frac{2}{2\sin^2 A-1}$

463) Prove that (cosec θ - sin θ) (sec θ - cos θ) (tan θ + cot θ) = 1

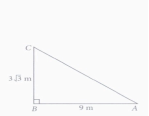
464) Prove that $\frac{1}{1+\sin\theta} + \frac{1}{1-\sin\theta} = 2\sec^2 0$

465) Prove that $\frac{\cot A-\cos A}{\cot A+\cos A} = \frac{\cos^2 A}{(1+\sin A)^2}$

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

Case Study Questions 6 x 4 = 24

467) Three friends - Anshu, Vijay and Vishal are playing hide and seek in a park. Anshu and Vijay hide in the shrubs and Vishal have to find both of them. If the positions of three friends are at A, Band C respectively as shown in the figure and forms a right angled triangle such that AB = 9 m, BC = $3\sqrt{3}$ m and $\angle$B = 90°, then answer the following questions.

(i) The measure of $\angle$A is

(a) 30° (b) 45° (c) 60° (d) None of these

(ii) The measure of $\angle$C is

(a) 30° (b) 45° (c) 60° (d) None of these

(iii) The length of AC is

$(a) 2\sqrt{3}\text{ m} (b)\sqrt{3}\text{ m} (c) 4\sqrt{3}\text{ m} (d) 6\sqrt{3}\text{ m}$

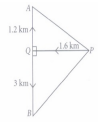
(iv) cos2A =

(a) 0 $(b)\frac{1}{2}$ $(c)\frac{1}{\sqrt{2}}$ $(d)\frac{\sqrt{3}}{2}$

(v) sin $\left(\frac{C}{2}\right)$ =

(a) 0 $(b)\frac{1}{2}$ $(c)\frac{1}{\sqrt{2}}$ $(d)\frac{\sqrt{3}}{2}$

468) Two aeroplanes leave an airport, one after the other. After moving on runway, one flies due North and other flies due South. The speed of two aeroplanes is 400 km/hr and 500 km/hr respectively. Considering PQ as runway and A and B are any two points in the path followed by two planes, then answer the following questions.

(i) Find $\tan\theta;$ if $\angle APQ = \theta$

$(a)\frac{1}{2}$ $(b)\frac{1}{\sqrt{2}}$ $(c)\frac{\sqrt{3}}{2}$ $(d)\frac{3}{4}$

(ii) Find cot B

$(a)\frac{3}{4}$ $(b)\frac{15}{4}$ $(c)\frac{3}{8}$ $(d)\frac{15}{8}$

(iii) Find tanA.

$(a)2$ $(b)\sqrt{2}$ $(c)\frac{4}{3}$ $(d)\frac{2}{\sqrt{3}}$

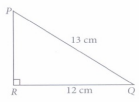
(iv) Find secA.

$(a)1$ $(b)\frac{2}{3}$ $(c)\frac{4}{3}$ $(d)\frac{5}{3}$

(v) Find cosecB.

$(a)\frac{17}{8}$ $(b)\frac{12}{5}$ $(c)\frac{5}{12}$ $(d)\frac{8}{17}$

469) Anita, a student of class 10th, has to made a project on 'Introduction to Trigonometry' She decides to make a bird house which is triangular in shape. She uses cardboard to make the bird house as shown in the figure. Considering the front side of bird house as right angled triangle PQR, right angled at R, answer the following questions.

(i) If $\angle PQR = \theta,$ then $\cos\theta =$

$(a)\frac{12}{5}$ $(b)\frac{5}{12}$ $(c)\frac{12}{13}$ $(d)\frac{13}{12}$

(ii) The value of sec θ =

$(a)\frac{5}{12}$ $(b)\frac{12}{5}$ $(c)\frac{13}{12}$ $(d)\frac{12}{13}$

(iii) The value of $\frac{\tan\theta}{1+\tan^2\theta} =$

$(a)\frac{5}{12}$ $(b)\frac{12}{5}$ $(c)\frac{60}{169}$ $(d)\frac{169}{60}$

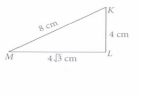
(iv) The value of $\cot^2\theta - \operatorname{cosec}^2\theta =$

(a) -1 (b) 0 (c) 1 (d) 2

(v) The value of $\sin^2\theta + \cos^2\theta =$

(a) 0 (b) 1 (c) -1 (d) 2

470) Ritu's daughter is feeling so hungry and so thought to eat something. She looked into the fridge and found some bread pieces. She decided to make a sandwich. She cut the piece of bread diagonally and found that it forms a righ.t angled triangle with sides 4 cm, $4\sqrt{3}$ cm and 8 cm.

On the basis of above information, answer the following questions.

(i) The value of $\angle$M =

(a) 30° (b) 60° (c) 45° (d) None of these

(ii) The value of $\angle$K =

(a) 45° (b) 30 ° (c) 60° (d) None of these

(iii) Find the value of tanM.

$(a)\sqrt{3}$ $(b)\frac{1}{\sqrt{3}}$ **(c) 1 (d) None of these**

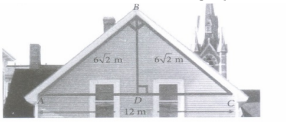
(iv) $\sec^2$M - 1 =

(a) tanM (b) tan2M (c) $\tan^2$M (d) None of these

(v) The value of $\frac{\tan^2 45^\circ - 1}{\tan^2 45^\circ + 1}$ is

(a) 0 (b) 1 (c) 2 (d) -1

471) Aanya and her father go to meet her friend Juhi for a party. When they reached to [uhi's place, Aanya saw the roof of the house, which is triangular in shape. If she imagined the dimensions of the roof as given in the figure, then answer the following questions.



(i) If D is the mid point of AC, then BD =

(a) 2m (b) 3m (c) 4m (d) 6m

(ii) Measure of $\angle$A =

(a) 30° (b) 60° (c) 45° (d) None of these

(iii) Measure of $\angle$C =

(a) 30° (b) 60° (c) 45° (d) None of these

(iv) Find the value of sinA + cosC.

(a) 0 (b) 1 (c) $\frac{1}{2}$ **(d)** $\sqrt{2}$

(v) Find the value of $\tan^2$C + $\tan^2$ A.

(a) 0 (b) 1 (c) 2 (d) $\frac{1}{2}$

472) If tan A = 3/4, then find the value of $\frac{1}{\sin A} + \frac{1}{\cos A}$.

473) State whether the following are true or false. Justify your answer
(i) The value of tan A is always less than 1.
(ii) $\sec A = \frac{12}{5}$ for some value of $\angle A$.
(iii) cos A is the abbreviation used for the cosecant of $\angle A$.
(iv) cot A is the product of cot and A.
(v) $\sin\theta = \frac{4}{3}$ for some $\angle\theta$.

474) State whether the following statements are true or false. Justify your answer.
sin (A + B) = sin A + sin B.

475) State whether the following statements are true or false. Justify your answer.
The value of sinθ increases and θ increases.

476) State whether the following statements are true or false. Justify your answer.
The value of cos θ increases and θ increases .

477) State whether the following statements are true or false. Justify your answer.
$\sin\theta = \cos\theta$ for all values of θ.

478) State whether the following statements are true or false. Justify your answer.
cot A is not defined for A = 0^0 .

479) Write all the other trigonometric ratios of $\angle A$ in terms of sec A.

480) Express the trigonometric ratios sin A, sec A and tan A in terms of cot A.

481) Prove the following identities, where the angles involved are acute angles for which the expressions are defined.
$(cosec\theta - \cot\theta)^2 = \frac{1-\cos\theta}{1+\cos\theta}$

482) Prove the following identities, where the angles involved are acute angles for which the expressions are defined.
$\frac{\cos A}{1+\sin A} + \frac{1+\sin A}{\cos A} = 2\sec A$

483) Prove the following identities, where the angles involved are acute angles for which the expressions are defined.
$\frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta} = 1 + \sec\theta cosec\theta$

484) Prove the following identities, where the angles involved are acute angles for which the expressions are defined.
$\frac{1+\sec A}{\sec A} = \frac{\sin^2 A}{1-\cos A}$

485) Prove the following identities, where the angles involved are acute angles for which the expressions are defined.
$\frac{\cos A-\sin A+1}{\cos A+\sin A-1} = cosecA + \cot A$ using the identity $cosec^2 A = 1 + \cot^2 A$

486) Prove the following identities, where the angles involved are acute angles for which the expressions are defined.
$\sqrt{\frac{1+\sin A}{1-\sin A}} = \sec A + \tan A$

487) Prove the following identities, where the angles involved are acute angles for which the expressions are defined.
$\frac{\sin\theta+2\sin^3\theta}{2\cos^3\theta-\cos\theta} = \tan\theta$

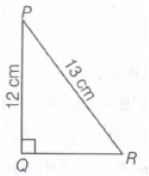
488) Prove the following identities, where the angles involved are acute angles for which the expressions are defined.
$(\sin A + cosecA)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$

489) Prove the following identities, where the angles involved are acute angles for which the expressions are defined.
$(cosecA - \sin A)(\sec A - \cos A) = \frac{1}{\tan A+\cot A}$

490) Prove the following identities, where the angles involved are acute angles for which the expressions are defined.
$\left(\frac{1+\tan^2 A}{1+\cot^2 A}\right) = \left(\frac{1-\tan^2 A}{1-\cot^2 A}\right) = \tan^2 A$

491) In $\triangle ABC$ right angled at B, AB = 24 cm and BC = 7 cm. Determine sin A, cos A.

492) In the following figure, find tan P - cot R.



493) If $\angle A$ and $\angle B$ are acute angles such that cos A = cos B, show that $\angle A$ and $\angle B$

494) If sin A = $\frac{3}{4}$ calculate cos A and tan A.

495) If cot θ = $\frac{7}{8}$, evaluate $\frac{(1+sin\theta)(1-sin\theta)}{(1+cos\theta)((1-cos\theta)}$

496) Given, $\sec\theta = \frac{13}{12}$ calculate all other trigonometric ratios.

497) If 3 cot A = 4, check whether $\frac{1-\tan^2 A}{1+\tan^2 A} = \cos^2 A - \sin^2 A$ or not.

498) In $\triangle PQR$ right angles at Q, PR + QR = 25 cm and PQ = 5 cm. Determine the values of sin P, cos P and tan P.

499) If $\angle$ B and $\angle$ Q are acute angles such that sin B = sin Q, then prove that $\angle$ B = $\angle$ Q.

500) Given, 15 cot A = 8, find sin A and sec A.

501) If cot θ = $\frac{7}{8}$, evaluate $\cot^2\theta$.

502) In $\triangle ABC$ right angled at B, AB = 24 cm and BC = 7 cm. Determine sin C, cos C.

503) In ΔABC, right-angled at B, if tan A = $\frac{1}{\sqrt{3}}$ then find the value of
sin A cos C + cos A sin C

504) In triangle ABC, right-angled at B, if tan A = $\frac{1}{\sqrt{3}}$ find the value of : cos A cos C – sin A sin C

505) If tan (A + B) = $\sqrt{3}$ and tan (A – B) = $\frac{1}{\sqrt{3}}$; 0° < A + B $\leq$ 90°; A > B, find the values of A and B.

506) If sinA=$\frac{12}{13}$, what is the value of cos A?

507) If tan$\theta = \frac{a}{b}$, find the value of sec θ.

508) If sin C=$\frac{15}{17}$, find the value of sin A.

509) In a $\triangle ABC, \angle B = 90^0$. If AB=2 cm and AC=3 cm, find the value of sin A,

510) If 17 cosA = 8, find 15 cosecA - 8 sec B.

511) If sin α =$\frac{1}{2}$, and α is an acute angle, fine the value of (3 cos α-4$\cos^3\alpha$).

512) In a $\triangle ABC$, right angled at A, having AB=5 cm, and BC=12 cm, find sin B, cos C and tan B.

513) If 3 tan A = 4, prove that
(i) $\sqrt{\frac{\sec A - cosecA}{\sec A + cosecA}} = \frac{1}{\sqrt{7}}$.
(ii) $\sqrt{\frac{1-\sin A}{1+\cos A}} = \frac{1}{2\sqrt{2}}$.

514) If $\sqrt{3}\sin\theta = \cos\theta$, find the value of $\frac{\tan\theta(1+\cot\theta)}{\sin\theta+\cos\theta}$.

515) Prove that $\frac{\sec^2\theta - \sin^2\theta}{\tan^2\theta} = cosec^2\theta - \cos^2\theta$.

516) Prove that $(1 + \tan A + \cot A)(\sin A - \cos A) = \sin A \tan A - \cos A \cot A$

517) In $\triangle ABC$, right angles at B, AC + BC = 49 cm, AB = 7 cm. Determine the values of sin A, cos A, tan C and sec C.

518) If $\sec\theta = \frac{4}{\sqrt{17}}$. prove that $\sqrt{\frac{2\tan^2\theta - cosec^2\theta}{2\cos^2\theta - \cot^2\theta}} = \frac{20}{7}$.

519) Find the value of $\sin^2 30^0 + \cos^2 45^0 + \cos^2 30^0$.

520) Find the value of $(\sin 30^0 + \cos 30^0) - (\sin 60^0 + \cos 60^0)$.

521) Find the value of $3\sin 30^0 - 4\sin^3 60^0$.

522) If x $\tan 45^0 \cos 60^0 = \sin 60^0 \cot 60^0$, find the value of x.

523) If $\triangle ABC$ is right angles at C, find the value of cos (A + B).

524) Find the value of
(i) $\sin\theta\cos\theta$ for $\theta = 30^0$
(ii) $3\tan^2 45^0 + 2\sin 45^0 \cos 45^0$

525) If $\sin\theta - \cos\theta = 0, (0 \le \theta \le 90^0)$ find the value of θ .

526) Determine the value of x, such that
$2cosec^2 30^0 + x\sin^2 60^0 - \frac{3}{4}\tan^2 30^0 = 10.$

527) If sin (A + B) = 1 and sin (A - B)$= \frac{1}{2}; 0 \le A + B \le 90^0$ and A > B, find the value of A and B.

528) In an acute $\triangle ABC$, if tan (A + B - C) = 1 and sec (B + C - A) = 2, find the angles A, B and C.

529) Evaluate $\frac{\cot 18^0}{\tan 72^0}$

530) Find the value of $\frac{\cot 40^0}{\tan 50^0} - \frac{\sin 35^0}{2\cos 35^0}$.

531) Evaluate $\left(\frac{\sin 25^0}{\cos 65^0}\right)^2 + \left(\frac{\tan 65^0}{\cot 25^0}\right)^2 - 2\cos^2 45^0.$

532) Evaluate cot 12^0 cot 38^0 cot 52^0 cot 60^0 cot 78^0 .

533) Evaluate tan 5^0 tan 25^0 tan 30^0 tan 65^0 tan 85^0

534) Express each of the following in terms of the trigonometric ratio of angles lying between 0^0 and 45^0 . sin 64^0 + cos 54^0

535) If $\sin\left(50^0 - \frac{3}{2}\theta\right) = \cos\left(3\theta - 50^0\right)$. find the value of θ and hence evaluate
$\tan\theta\ sec\theta\ sin\theta - \ cot\theta\ sin\theta\ cos\theta.$

536) If A, B, C are the angles of a $\triangle ABC$, prove that $\tan\left(\frac{B+C}{2}\right) = \ cot\frac{A}{2}$.

537) Find the value of $(cosec^2\theta - 1)\tan^2\theta.$

538) Show that $\sqrt{\frac{1+\cos A}{1-\cos A}} = cosec \quad A + \cot A$

539) Show that (1- sin A + cos A)^2 = 2(1- sin A)(1+ cos A)

540) Show that $\frac{\sin\theta}{1+\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = 2cosec\theta$

541) Find the values of the constant a and b for which $\sin x \times \cos x(5\tan x + 2\cot x) = a + b\sin^2 x$

542) Prove that $(1 + \tan^2\theta)\left(1 + \frac{1}{\tan^2\theta}\right) = \frac{1}{\sin^4\theta - \sin^4\theta}$

543) Prove that $(1 + \cot\theta - cosec\theta)(1 + \tan\theta + \sec\theta) = 2.$

544) Prove that $\tan^2\theta + \cot^2\theta + 2 = \sec^2\theta + cosec^2\theta.$

545) Prove that $\frac{\sec^2\theta - \sin^2\theta}{\tan^2\theta} = 1 + \cot^2\theta - \cos^2\theta$

546) Prove that $\frac{1-\cos A+\sin A}{\sin A+\cos A-1} = \frac{1+\sin A}{\cos A}$.

547) Prove that $(cosec\theta - \sin\theta)(\sec\theta - \cos\theta) = \sin\theta.\cos\theta = \frac{1}{\tan\theta+\cot\theta}$

548) Prove that $\sqrt{\frac{\sin A+1}{1-\sin A}} + \sqrt{\frac{1-\sin A}{\sin A+1}} = 2\sec A.$

549) Prove that $\sec^2\theta - \frac{\sin^2\theta - 2\sin^4\theta}{2\cos^4\theta - \cos^2\theta} = 1$

550) Prove that $(\tan\theta+\sec\theta-1)(\tan\theta+1+\sec\theta)=\frac{2\sin\theta}{1-\sin\theta}$

551) Given that 2 sin A cos A + (cos A + sin A)^2 - (2 cos A + sin A)^2 = p sin^2 A + q. Find the value of p and q.

552) Prove that $\frac{cosec\theta+\cot\theta}{cosec\theta-\cot\theta}=(cosec\theta+\cot\theta)^2=1+2\cot^2\theta+2cosec\theta.\cot\theta$

553) Prove that q (p^2 - 1)=2 p, where $\sin\theta+\cos\theta=p$ and $\sec\theta+cosec\theta=q$.

554) If $\sec\theta+\tan\theta=p,$ show that $\sec\theta-\tan\theta=\frac{1}{p}$. Hence fin the value of $\cos\theta$ and $\sin\theta$.

555) Prove that $\frac{\sin A}{1+\cos A}+\frac{\sin A}{1-\cos A}=\sqrt{\frac{1+\cos A}{1-\cos A}}+\sqrt{\frac{1-\cos A}{1+\cos A}}$ = 2 cosec A

556) If $\cos\theta-\sin\theta=\sqrt{2}\sin\theta,$ prove that $\cos\theta+\sin\theta=\sqrt{2}\cos\theta$

557) Show that $2(\sin^6\theta+\cos^6\theta)-3(\sin^4\theta+\cos^4\theta)+1=0.$

558) If $\tan(A+B)=\sqrt{3}$ and $(\tan(A-B)=1/\sqrt{3},\quad 0^0B,\backslash)$ find the value of A and B.

559) Show that $\tan 48^0\tan 23^0\tan 42^0\tan 67^0=1.$

560) Show that $\cos 38^0\cos 52^0-\sin 38^0\sin 52^0=0$

561) If sec 4A = cosec(A - 20^0), where 4A is an acute angle, find the value of A.

562) If A, B and C are interior angles of a $\triangle ABC$, show that $\sin\left(\frac{B+C}{2}\right)=\cos\frac{A}{2}$.

563) Express sin 67^0 +cos 75^0 in terms of trigonometric ratios of angles between 0^0 and 45^0 .

564) Evaluate $\frac{\sin^2 63^0+\sin^2 27^0}{\cos^2 17^0+\cos^2 73^0}$

565) Evaluate $\sin 25^0\cos 65^0+\sin 25^0\cos 65^0$

566) Prove that $\cot^2 A\left[\frac{\sec A-1}{1+\sin A}\right]+\sec^2 A\left[\frac{\sin A-1}{1+\sec A}\right]=0$

567) Prove that $\left[\frac{1}{\frac{1}{\cos^2\theta}-\cos^2\theta}+\frac{1}{\frac{1}{\sin^2\theta}-\sin^2\theta}\right]\sin^2\theta\cos^2\theta=\frac{1-\sin^2\theta\cos^2\theta}{2+\sin^2\theta\cos^2\theta}$

568) Find the value of $\frac{\sec\theta cosec(90^0-\theta)-\tan\theta\cot(90^0-\theta)+\sin^2(90^0-35^0)+\sin^2 35^0}{\tan 10^0\tan 20^0\tan 60^0\tan 70^0\tan 80^0}$

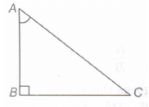
569) Prove that $\frac{(1+\cot\theta+\tan\theta)(\sin\theta-\cos\theta)}{\sec^3\theta-cosec^3\theta}=\sin^2\theta\cos^2\theta.$

570) If tan A = a tan B and sin A = b sin B, prove that $\cos^2 A=\frac{b^2-1}{a^2-1}$

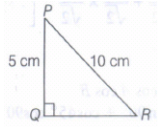
571) If $cosec\theta-\sin\theta=m\quad and\quad \sec\theta-\cos\theta=n$,then prove that $(m^2n)^{2/3}+(mn^2)^{2/3}=1$

572) Soni was trying hard to prove $a\sin\theta+b\cos\theta=\pm\sqrt{a^2+b^2-c^2}$,when $a\sin\theta+b\cos\theta=c$.Her classmate Swati gave her a hint of squaring both sides of $a\sin\theta+b\cos\theta=c$ and proceed further. Following her hint, Soni was able to solve the problem and she thanks Swati for this hint.
(i) Write the solution of the problem.
(ii) What value of is depicted here?

573) In the following figure, $\triangle$ABC is right angles at B and $\tan A=\frac{4}{3},$ find the length of AC.



574) In the following figure, $\triangle PQR$ is right angled at Q, PQ=5 cm, PR=6cm. Determine $\angle QPRand\angle PRQ.$



575) Evaluate : tan^2 30° sin 30° + cos 60° sin^2 90° tan^2 60° - 2 tan 45° cos^2 0° sin 90°

576) If cos (A + B) = 0 and cot (A - B) = $\sqrt{3}$, find the value of :
(i) sec A. tan B - cot A.sin B
(ii) cosec A. cot B + sin A. tan B

577) Given that $(A+B)=\frac{\tan A+\tan B}{1-\tan A\tan B}$, find the values of tan 75° and tan 90° by taking suitable values of A and B.

578) Evaluate : $\sin^2 30° \cos^2 45° + 4\tan^2 30° + \frac{1}{2}\sin^2 90° - 2\cos^2 90° + \frac{1}{24}$

579) Evaluate : $4(\sin^4 30° + \cos^4 60°) - 3(\cos^2 45° - \sin^2 90°)$

580) If $15\tan^2\theta + 4\sec^2\theta = 23$, then find the value of $(\sec\theta + cosec\theta)^2 - \sin^2\theta$

581) If $\sqrt{3}\cot^2\theta - 4\cot\theta + \sqrt{3} = 0$, then find the value of $\cot^2\theta + \tan^2\theta$.

582) Evaluate the following :
$\frac{2\cos^2 60°+3\sec^2 30°-2\tan^2 45°}{\sin^2 30°+\cos^2 45°}$

583) Evaluate : $\frac{\cos 65°}{\sin 25°} - \frac{\tan 20°}{\cot 70°} - \sin 90° + \tan 5°\tan 35°\tan 60°\tan 55°\tan 85°$

584) Prove that : $\frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta} = 1 + \tan\theta + \cot\theta$

585) In an acute angled triangle ABC, if sin (A + B - C) = $\frac{1}{2}$ and cos (B + C - A) = $\frac{1}{\sqrt{2}}$, find $\angle A, \angle B$ and $\angle C$

586) From a point on the ground, the angles of elevation of the bottom and top of a tower fixed at the top of a 20 m high building are 45° & 60° respectively. Find the height of the tower.

587) If (sec A + tan A)(sec B + tan B)(sec C + tan C) = (sec A - tan A)(sec B - tan B)(sec C - tan C), prove that each of the side is equal to $\pm$ 1.

588) From the top of the tower, 100 m high, a man observes two cars on the opposite sides of the tower with the angles of depression 30° & 45° respectively. Find the distance between the cars.

589) If $4\sin\theta = 3$, find the value of x if $\sqrt{\frac{cosec^2\theta-\cot^2\theta}{\sec^2\theta-1}} + 2\cot\theta = \frac{\sqrt{7}}{x} + \cos\theta$

590) The angle of elevation of the top B of a tower AB from a point X on the ground is 60°. At a point Y, 40m vertically above X, the angle of elevation of the top is 45°. Find the height of the tower AB and the distance XB.

591) A vertical tower stands on a horizontal plane and is surmounted by a flagstaff of height 5 m. From a point on the ground, the angles of elevation of the top and bottom of the flag staff are 60° and 30° respectively. Find the height of the tower and the distance of the point from the tower.

592) The angle of elevation of the top Q of a vertical tower PQ from a point X on the ground is 60°. From a point, y 40 m vertically above X, the angle of elevation of the top Q of the tower is 45°. Find the height of the tower PQ and the distance PX.

593) If $\sec\theta + \tan\theta = p$, show that $\sec\theta - \tan\theta = \frac{1}{p}$. Hence, find the values of $\cos\theta$ and $\sin\theta$.

594) Two poles of equal height are standing opposite to each other on either side of the road which is 80 m wide. From a point P between them on the road, the angle of elevation of the top of a pole is 60° and the angle of depression from the top of another pole at point P is 30°. Find the heights of the poles and the distances of the point P from the poles.

595) Two posts are k metre apart and the height of one is double that of the other. If from the midpoint of the line segment joining their feet, an observer finds the angles of elevation of their tops to be complementary, then find the height of the shorted post.

596) The angle of elevation of the top of a tower at a distance of 120 m from a point A on the ground is 45°. If the angle of elevation of the top of a flagstaff fixed at the top of the tower, at A is 60°, then find the height of the flagstaff.

597) A man on the top of a vertical tower observes a car moving at a uniform speed towards him. If it takes 12 min for the angle of depression to change from 30° to 45°, how soon after this, the car will reach the tower?

598) From the top of a building, 60 m high the angles of depression of the top and the bottom of a tower are observed to be 30° and 60°. Find the height of the tower.

599) The angle of elevation of the top of a building from the foot of the tower is 30°and the angle of elevation of the top of the tower from the foot of the building is 60°.If the tower is 60m high, find the height of the building.

600) The angle of elevation of a cloud from a point 120 m above a lake is 30° and the angle of depression of its reflection in the lake is 60°. Find the height of the cloud.

601) The angle of elevation of a jet plane from a point A on the ground is 60°. After a flight of 30 seconds, the angle of elevation changes to 30°. If the jet plane is flying at a constant height of $3000\sqrt{3}$m, find the speed of the jet plane.

602) A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88·2 m from the ground. The angle of elevation of the balloon form the edges of the girl at any instant of 60°. After sometime, the angle of elevation reduces to 30°.
(i) Find the distance travelled by the balloon during the interval.
(ii) Which mathematical concept is used in the above problem?
(iii) What is its value?

603) A man on a cliff observes a boat at an angle of depression of 30° which is approaching the shore to the point immediately beneath the observer with a uniform speed. Six minutes later, the angle of depression of the boat is found to be 60°.
(i) Find the time taken by the boat to reach the shore.
(ii) Which mathematical concept is used in the above problem?
(iii) What is its value?

604) The angle of elevation of the top of a chimney from the foot of a tower is 60° and the angle of depression of the foot of the chimney from the top of the tower is 30°. If the height of tower is 40 m, find the height of smoke emitting chimney. According to pollution control norms, the minimum height of a smoke emitting chimney should be 100 m. What value is discussed in this question?

605) Prove that $b^2 x^2 - a^2 y^2 = a^2 b^2$, if :
(i) $x = a\sec\theta, y = b\tan\theta$ or
(ii) $x = acosec\theta, y = b\cot\theta$

606) If $cosec\theta - \cot\theta = \sqrt{2}\cot\theta$, then prove that $cosec\theta + \cot\theta = \sqrt{2}\ cosec\theta$

607) If x = tan A + sin A and y = tan A - sin A, prove that :
$\left(\frac{x+y}{x-y}\right)^2 - \left(\frac{x+y}{2}\right)^2 = 1$

608) Prove that : $\frac{\cot^3\theta.\sin^3\theta}{(\cos\theta+\sin\theta)^2} + \frac{\tan^3\theta.\cos^3\theta}{(\cos\theta+\sin\theta)^2} = \frac{\sec\theta cosec\theta - 1}{cosec\theta+\sec\theta}$

609) Prove that : $\sqrt{\frac{\sec\theta-1}{\sec\theta+1}} + \sqrt{\frac{\sec\theta+1}{\sec\theta-1}} = 2cosec\theta$

610) If $\sin A = \frac{1}{\sqrt{5}}$ and $\sin B = \frac{1}{\sqrt{10}}$, find the values of cos A and cos B. Hence using the formula cos (A + B) = cos A cos B - sin A sin B, show that A + B = 45°.

611) Prove that : $\frac{\tan\theta+\sin\theta}{\tan\theta-\sin\theta} = \frac{\sec\theta+1}{\sec\theta-1}$

612) Prove that : $\frac{cosecA}{cosecA-1} + \frac{cosecA}{cosecA+1} = 2\sec^2 A$

613) If $cosec\theta + \cot\theta = p$, then prove that $\cos\theta = \frac{p^2-1}{p^2+1}$

614) If $a\cos\theta + b\sin\theta = m$ and $a\sin\theta - b\cos\theta = n$, prove that $m^2 + n^2 = a^2 + b^2$

615) Prove that : $\frac{\tan\theta+\sec\theta-1}{\tan\theta-\sec\theta+1} = \frac{1+\sin\theta}{\cos\theta}$

616) Prove that : $\frac{\cos^2\theta}{1-\tan\theta} + \frac{\sin^3\theta}{\sin\theta-\cos\theta} = 1 + \sin\theta + \cos\theta$

617) If $\cos\theta + \sin\theta = p$ and $\sec\theta + cosec\theta = q$, prove that $q(p^2 - 1) = 2p$.

618) If x = r sin A cos C, y = r sin A sin C and z = r cos A, then prove that $x^2 + y^2 + z^2 = r^2$.

619) Prove that : $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} + \sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = 2\sec\theta$

620) Prove that : $(1-\sin\theta+\cos\theta)^2 = 2(1+\cos\theta)(1-\sin\theta)$

621) Prove that : $\frac{\tan\theta+\sec\theta-1}{\tan\theta-\sec\theta-1} = \sec\theta+\tan\theta$

622) Prove that : $(\sin\theta+cosec\theta)^2+(\cos\theta+\sec\theta)^2 = 7+\tan^2\theta+\cot^2\theta$

623) Prove that : $(1+\cot A-cosecA)(1+\tan A+\sec A) = 2$

624) If $\sin\theta = \frac{c}{\sqrt{c^2+d^2}}$ and d > 0, find the value of $\cos\theta$ and $\tan\theta$.

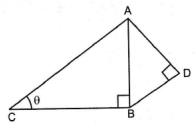
625) If $\tan\theta = \frac{1}{\sqrt{5}}$,
(i) Evaluate : $\frac{cosec^2\theta-\sec^2\theta}{cosec^2\theta+\sec^2\theta}$
(ii) Verify the identity : $\sin^2\theta+\cos^2\theta = 1$

626) If θ is an acute angle and $cosec\theta = \sqrt{5}$, then
(i) Evaluate : $\cot\theta = cosec\theta$
(ii) Verify the identity : $\sin^2\theta+\cos^2\theta = 1$

627) Evaluate : $\frac{\cot(90^\circ-\theta)\sin(90^\circ-\theta)}{\sin\theta}+\frac{\cot 40^\circ}{\tan 50^\circ}-\left(\cos^2 20^\circ+\tan^2 70^\circ\right)$

628) Evaluate : $\frac{cosec^2(90^\circ-\theta)-\tan^2\theta}{4(\cos^2 40^\circ+\cos^2 50^\circ)}-\frac{2\tan^2 30^\circ\sec^2 52^\circ\sin^2 38^\circ}{3\left(cosec^2 70^\circ-\tan^2 20^\circ\right)}$

629) In the given figure, AD = 4 cm, BD = 3cm and CB = 12cm, find cot θ.



630) If $\tan\theta = \frac{4}{3}$, what is the value of $\left[\frac{sin\,\theta+cos\,\theta}{sin\,\theta-cos\,\theta}\right]$?

631) If $\tan\theta+\frac{1}{tan\,\theta} = 2$, find the value of $\tan^2\theta+\frac{1}{tan^2\theta}$

632) In figure, AD = DB and ∠B is right angle. Determine $\sin^2\theta+\cos 2\theta$.

633) In the figure, ABC is a right angled triangle, D is the mid-point of BC, Show that $\frac{tan\,\theta}{tan\,\phi} = \frac{1}{2}$.

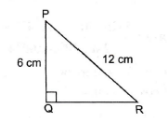
634) If $\tan\frac{5\theta}{2} = \sqrt{3}$ and θ is acute, then find the value of 2θ.

635) If $\sqrt{3}\,sin\,\theta = cos\,\theta$, find the value of $\frac{3\,cos^2\theta+2\,cos\,\theta}{3\,cos\,\theta+2}$

636) Evaluate: $3\cot^2 60^\circ+\sec^2 45^\circ$

637) If sin A = $\frac{\sqrt{3}}{2}$, find the value of $2\cot^2 A-1$.

638) In figure, △ PQR right angled at Q. PQ = 6 cm, PR = 12 cm, Determine ∠QPR = ∠PRQ.



639) sin 4A = cos (A - 20°), where 4A is an acute angle, find the value of A.

640) Prove without using trigonometric tables:
$\frac{1}{1+cos(90^\circ-\theta)}+\frac{1}{1-cos(90^\circ-\theta)} = 2\,cosec^2(90^\circ-\theta)$

641) If x = γ cos ∝ sin β; y = γ cos∝ cosβ and z = Y sin∝, show that $x^2+y^2+z^2 = Y^2$

642) Without using trigonometric tables, evaluate following:
$\frac{3\,cos\,55^\circ}{7\,sin\,35^\circ} = \frac{4(cos\,70^\circ.cosec\,20^\circ)}{7(tan\,5^\circ.tan\,25^\circ.tan\,45^\circ.tan\,65^\circ.tan\,85^\circ)}$

643) Without using trigonometric table, evaluate $\frac{cos\,58^\circ}{sin\,32^\circ}+\frac{sin\,22^\circ}{cos\,68^\circ}-\frac{cos\,38^\circ\,cosec\,52^\circ}{tan\,18^\circ.tan\,35^\circ tan\,72^\circ.tan\,55^\circ}$

644) Solve the equation for θ=$\frac{cos^2\theta}{cot^2\theta-cos^2\theta} = 3$

645) If 6x = sec θ and $\frac{6}{x}$ = tan θ, find the value of $9\left(x^2-\frac{1}{x^2}\right)$.

646) Simplify: $\frac{sin^3\theta+cos^3\theta}{sin\,\theta+cos\,\theta}+sin\,\theta\,cos\,\theta$

647) Evaluate: $\frac{2}{3}$cosec^{2}58^0 -$\frac{2}{3}$cot58^0.tan32^0-$\frac{5}{3}$tan13^0.tan37^0.tan45^0.tan53^0.tan77^0

648) Find the value of sec 50° sin 40° + cos 40° cosec 50°.

649) Find the value of x if $4\left(\frac{sec^2 59^0-cot^2 31^0}{3}\right)$-$\frac{2}{3}$sin 90^0+3tan^{2}56^{0}xtan^{2}34^0=$\frac{x}{3}$

650) Find the value of sin^2 20° + sin^2 70° - tan^2 45°.

651) Prove the following identity $\frac{sinA}{secA+tanA-1}+\frac{cosA}{cosecA+cotA-1}=1$

652) sin^2 A cos^2 B - cos^2 A sin^2 B = sin^2 A - sin^{2}B

653) Sin^{2}A+$\frac{1}{1+tan^2A}=1$

654) Find the value of other trigonometric ratios. given that tan $\theta=\frac{2mn}{m^2-n^2}$

655) $\frac{sinA+cosA}{sinA-cosA}+\frac{sinA-cosA}{sinA+cosA}=\frac{2}{2sin^2A-1}$

656) (1 + cot^2 θ) (1 - cos θ) (1 + cos θ) = 1.

657) Prove that $\frac{\tan\theta}{1-\tan\theta}-\frac{\cot\theta}{1-\cot\theta}=\frac{\cos\theta+\sin\theta}{\cos\theta-\sin\theta}$

658) If $\frac{y\sin^2 63^\circ+y\sin^2 27^\circ}{4\cos^2 17^\circ+4\cos^2 73^\circ}=-\frac{1}{2}$,then find the value of x.

659) If $\frac{y\sin^2 63^\circ+y\sin^2 27^\circ}{4\cos^2 17^\circ+4\cos^2 73^\circ}=-\frac{1}{2}$, then find the value of x.

660) Write all the other trigonometric ratios of angle A in terms of cosec A.

661) Prove that $\frac{\sin A-2\sin^3 A}{2\cos^3 A-\cos A}=\tan A$

662) Prove that $\left[\frac{1}{\sec^2\theta-\cos^2\theta}+\frac{1}{\mathrm{cosec}^2\theta-\sin^2\theta}\right]\sin^2\theta\cos^2\theta=\frac{1-\sin^2\theta\cos^2\theta}{2+\sin^2\theta\cos^2\theta}$

663) Evaluate $\frac{\mathrm{cosec}^2(90^\circ-\theta)-\tan^2\theta}{2(\cos^2 37^\circ+\cos^2 53^\circ)}-\frac{2\tan^2 30^\circ\sec^2 37^\circ\cdot\sin^2 53^\circ}{\mathrm{cosec}^2 63^\circ-\tan^2 27^\circ}$

664) Prove that $\frac{\sin^2 40^\circ+\sin^2 50^\circ}{\cos^2 20^\circ+\cos^2 70^\circ}+\tan 10^\circ\tan 20^\circ\tan 60^\circ\tan 70^\circ\tan 80^\circ=1+\sqrt{3}$

665) If tan θ + sec θ = l, then prove that $\sec\theta=\frac{l^2+1}{2l}$

666) If sec A = $\frac{17}{8}$ show that $\frac{3-4\sin^2 A}{4\cos^2 A-3}=\frac{3-\tan^2 A}{1-3\tan^2 A}$

667) Show that (sin ^{8} A - cos ^{8} A)= (2 sin^2 A -1)(1- 2sin^2 A cos^2 A).

668) Prove that $\frac{\cot A+\mathrm{cosec}\,A-1}{\cot A-\mathrm{cosec}\,A+1}=\frac{1+\cos A}{\sin A}$

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

670) If sin (90°- θ) + cos(90^0- θ) = $\sqrt{2}$ sin (90° - θ), show that (sin θ - cosθ) = $\sqrt{2}$ sin θ.

671) If cosec A - cot A = q, show that $\frac{q^2-1}{q^2+1}+\cos A=0$

672) Prove that 2 sec^2 θ - sec$^4\theta$ - 2 cosec $^2\theta$ + cosec $^4\theta$ = cot $^4\theta$ - tan ^{4} θ.

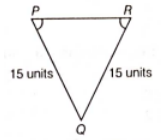
673) Prove that $\left(\tan\theta+\frac{1}{\cos\theta}\right)^2+\left(\tan\theta-\frac{1}{\cos\theta}\right)^2=2\left(\frac{1+\sin^2\theta}{1-\sin^2\theta}\right)$

674) Prove that l^2 m^2(l^2 + m^2 +3) = 1 if cosecθ - sin θ = 1 and secθ - cosθ = m.

675) The angle of elevation of a jet plane from a point A on the ground is 60°. After a flight of 30 sec, the angle of elevation changes to 30°. If the jet plane is flying at a constant height of 3600 $\sqrt{3}$ m, find the speed of the jet plane.

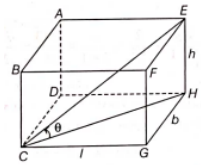
676) A man on a cliff observes a boat at an angle of depression of 30° which is approaching the shore to the point immediately beneath the observer with a uniform speed. Six minutes later, the angle of depressions of the boat is found to be 60°. Find the time taken by the boat from here to reach the shore.

677) In the figure below, 5sin P= 4.



(Note The figure is not to scale)
What is the length of PR? Draw a diagram and show your steps.

678) Shown below is a cuboid. Its length is lunits, breadth b units and height h units



(i) Express cosθ in terms of l, b and h.
(ii) If the figure was a cube, what would be the value of cosθ?
Show your work.

679) $\frac{1}{\operatorname{cosec}\theta - \cot\theta} - \frac{\cot\theta}{\cos\theta} = \cot\theta$

680) $\text{If } \frac{1}{\sin\theta - \cos\theta} = \frac{\operatorname{cosec}\theta}{\sqrt{2}}, \text{ prove that } \left(\frac{1}{\sin\theta + \cos\theta}\right)^2 = \frac{\sec^2\theta}{2}$

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