CBSE

INTRODUCTION TO TRIGONOMETRY WS 1

Class 10 - Mathematics

Section A

1. If θ is an acute angle such that $\tan^2\theta = \frac{8}{7}$, then the value of $\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$ is **[1]**

   a) $\frac{64}{49}$ b) $\frac{7}{8}$

   c) $\frac{7}{4}$ d) $\frac{8}{7}$

2. If $\sin\theta = \frac{1}{2}$ then $\cot\theta$ = ? **[1]**

   a) $\frac{1}{\sqrt{3}}$ b) 1

   c) $\frac{\sqrt{3}}{2}$ d) $\sqrt{3}$

3. If $\sin\theta = \frac{\sqrt{3}}{2}$ then (cosec θ + cot θ) = ? **[1]**

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

   c) $2\sqrt{3}$ d) $\sqrt{3}$

4. Given that $\sin\theta = \frac{a}{b}$, then $cos\ \theta$ is equal to **[1]**

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

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

5. If 5 tan θ - 4 = 0, then the value of $\frac{5\sin\theta-4\cos\theta}{5\sin\theta+4\cos\theta}$ is **[1]**

   a) $\frac{5}{3}$ b) $\frac{5}{6}$

   c) $\frac{1}{6}$ d) 0

6. If cos θ = $\frac{2}{3}$, then 2 sec^2 θ + 2 tan^2 θ - 7 is equal to **[1]**

   a) 1 b) 4

   c) 0 d) 3

7. If $cosec\ \theta = \sqrt{10}$ then sec θ = ? **[1]**

   a) $\frac{2}{\sqrt{10}}$ b) $\frac{3}{\sqrt{10}}$

   c) $\frac{\sqrt{10}}{3}$ d) $\frac{1}{\sqrt{10}}$

8. If $\tan\theta = \frac{1}{\sqrt{7}}$ then $\frac{cosec^2\theta-\sec^2\theta}{cosec^2\theta+\sec^2\theta} =$ **[1]**

   a) $\frac{1}{12}$ b) $\frac{3}{7}$

   c) $\frac{3}{4}$ d) $\frac{5}{7}$

9. If $\tan\theta = \frac{a}{b}$, then $\frac{a\sin\theta+b\cos\theta}{a\sin\theta-b\cos\theta}$ is **[1]**

   a) $\frac{a+b}{a-b}$ b) $\frac{a^2-b^2}{a^2+b^2}$

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

10. If $\tan\theta = \frac{4}{3}$ then $(\sin\theta + \cos\theta) =$? **[1]**

a) $\frac{7}{5}$ b) $\frac{7}{3}$

c) $\frac{5}{7}$ d) $\frac{7}{4}$

11. If 2x = sec A and $\frac{2}{x}$ = tan A then $2\left(x^2 - \frac{1}{x^2}\right)$ = ? **[1]**

a) $\frac{1}{2}$ b) $\frac{1}{4}$

c) $\frac{1}{16}$ d) $\frac{1}{8}$

12. If $\tan\theta = \frac{5}{12}$, then the value of $\frac{\sin\theta+\cos\theta}{\sin\theta-\cos\theta}$ is: **[1]**

a) $\frac{17}{13}$ b) $-\frac{17}{7}$

c) $\frac{17}{7}$ d) $-\frac{7}{13}$

13. If θ is an acute angle such that cos $\theta = \frac{3}{5}$, then $\frac{\sin\theta\tan\theta-1}{2\tan^2\theta}$ = **[1]**

a) $\frac{1}{36}$ b) $\frac{16}{625}$

c) $\frac{160}{3}$ d) $\frac{3}{160}$

14. If sec $\theta = \frac{25}{7}$ then sin θ = ? **[1]**

a) $\frac{24}{7}$ b) $\frac{24}{25}$

c) $\frac{7}{24}$ d) $\frac{23}{25}$

15. If cos A = $\frac{4}{5}$, then the value of tan A is? **[1]**

a) $\frac{4}{3}$ b) $\frac{3}{4}$

c) $\frac{3}{5}$ d) $\frac{5}{3}$

16. If $\tan\theta = \frac{3}{4}$, then $\cos^2\theta - \sin^2\theta =$ **[1]**

a) $\frac{7}{25}$ b) $\frac{-7}{25}$

c) 1 d) $\frac{4}{25}$

17. If 8 tan x = 15, then sin x - cos x is equal to **[1]**

a) $\frac{17}{7}$ b) $\frac{8}{17}$

c) $\frac{7}{17}$ d) $\frac{1}{17}$

18. If 5 cot θ = 3, then $\frac{5\sin\theta-3\cos\theta}{4\sin\theta+3\cos\theta}$ is equal to **[1]**

a) $\frac{11}{18}$ b) $\frac{14}{27}$

c) $\frac{16}{29}$ d) $\frac{16}{26}$

19. If 3 cot θ = 4 then $\frac{(5\sin\theta+3\cos\theta)}{(5\sin\theta-3\cos\theta)}$ =? **[1]**

a) $\frac{1}{9}$ b) 3

c) 9 d) $\frac{1}{3}$

20. If 3x = cosec θ and $\frac{3}{x} = \cot\theta$ then $3\left(x^2 - \frac{1}{x^2}\right)$ = ? **[1]**

a) $\frac{1}{9}$ b) $\frac{1}{81}$

c) $\frac{1}{27}$ d) $\frac{1}{3}$

21. Which of the following is correct? **[1]**

i. $3(\sin\theta - \cos\theta)^4 + 6(\sin\theta + \cos\theta)^2 + 4(\sin^6\theta + \cos^6\theta)$ is independent of θ.

ii. If $\text{cosec}\theta - \sin\theta = a^3$, $\sec\theta - \cos\theta = b^3$, then $a^2b^2(a^2 + b^2) = 2$

a) Both (i) and (ii)

b) Neither (i) nor (ii)

c) Only (i)

d) Only (ii)

22. If $3\cos\theta = 5\sin\theta$, then the value of $\frac{5\sin\theta - 2\sec^3\theta + 2\cos\theta}{5\sin\theta + 2\sec^3\theta - 2\cos\theta}$ is **[1]**

a) $\frac{542}{2937}$

b) $\frac{271}{979}$

c) $\frac{322}{2657}$

d) $\frac{316}{2937}$

23. If $\cos A = \frac{5}{8}$, then value of $\cot A \cdot \sin A$ is: **[1]**

a) $\frac{8}{5}$

b) $\frac{5}{8}$

c) $\frac{8}{\sqrt{39}}$

d) $\frac{5}{\sqrt{39}}$

24. If $\cos\theta = \frac{4}{5}$ then $\tan\theta$ = ? **[1]**

a) $\frac{3}{4}$

b) $\frac{5}{3}$

c) $\frac{4}{3}$

d) $\frac{3}{5}$

25. If $7\tan\theta = 4$ then $\frac{(7\sin\theta - 3\cos\theta)}{(7\sin\theta + 3\cos\theta)} = ?$ **[1]**

a) $\frac{3}{7}$

b) $\frac{1}{7}$

c) $\frac{5}{14}$

d) $\frac{5}{7}$

26. If $2\tan A = 3$, then the value of $\frac{4\sin A + 3\cos A}{4\sin A - 3\cos A}$ is **[1]**

a) 3

b) does not exist

c) $\frac{7}{\sqrt{13}}$

d) $\frac{1}{\sqrt{13}}$

27. If $\sin A = \frac{1}{2}$, then the value of cot A is **[1]**

a) $\sqrt{3}$

b) $\frac{\sqrt{3}}{2}$

c) $\frac{1}{\sqrt{3}}$

d) 1

28. If $16\cot x = 12$, the $\frac{\sin x - \cos x}{\sin x + \cos x}$ equals. **[1]**

a) $\frac{2}{7}$

b) $\frac{3}{7}$

c) 0

d) $\frac{1}{7}$

29. **Assertion (A):** $\tan^2\theta + \cot^2\theta = 2$ if $\theta = 45^o$ **[1]**

Reason (R): $\tan\theta = \frac{\sin\theta}{\cos\theta}$ and $\cot\theta = \frac{\cos\theta}{\sin\theta}$

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

30. **Assertion (A):** $\sin\theta = \frac{1}{\tan\theta}$ **[1]**

Reason (R): $\tan\theta = \frac{\sin\theta}{\cos\theta}$

a) Both A and R are true and R is the correct

b) Both A and R are true but R is not the

explanation of A.

correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

31. **Assertion (A):** $\sin\theta \times \text{cosec}\theta = \cot\theta$ **[1]**

Reason (R): $\sin\theta$ is reciprocal of $\text{cosec}\theta$

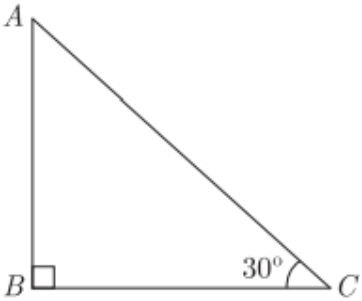
a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

32. **Assertion (A):** In the figure, if BC = 20 m, then the height AB is 11.56 m. **[1]**



Reason (R): $\tan\theta = \frac{AB}{BC} = \frac{\text{perpendicular}}{\text{base}}$ where θ is the angle $\angle$ACB.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

33. **Assertion (A):** The value of $\sin\theta = \frac{4}{3}$ is not possible. **[1]**

Reason (R): Hypotenuse is the largest side in any right-angled triangle.

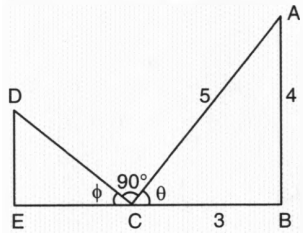
a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

34. In the given figure, the value of $\cos\phi$ is **[1]**



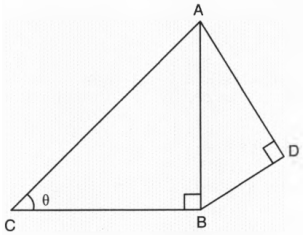
a) $\frac{5}{3}$

b) $\frac{3}{5}$

c) $\frac{4}{5}$

d) $\frac{5}{4}$

35. In the given figure, if AD = 4 cm BD = 3 and CB = 12 cm, then $\cot\theta$ is **[1]**



a) $\frac{13}{12}$

b) $\frac{12}{5}$

c) $\frac{12}{13}$

d) $\frac{5}{12}$

36. Which of the following statement is true: **[1]**

a) $\frac{\cos ecA}{\sin A} = \cos A$ b) $\frac{\cos A}{\sin A} = \sec A$

c) $\frac{\sin A}{\cos ecA} = \cot A$ d) $\frac{\sin A}{\cos A} = \tan A$

37. Which of the following is true: **[1]**

a) sin A + cosec A = 1 b) sin A + cos A = 1

c) cos A sec A = 1 d) sin A cot A = 1

38. If sec $\theta = \frac{25}{7}$, then find the value of cot θ. **[1]**

39. If it is given that 5 tan θ = 3, then what is the value of $\left(\frac{5\sin\theta - 3\cos\theta}{4\sin\theta + 3\cos\theta}\right)$? **[1]**

40. If 5 tan θ = 4, show that $\frac{5\sin\theta - 3\cos\theta}{5\sin\theta + 3\cos\theta} = \frac{1}{7}$. **[1]**

41. If cos (A + B) = sin (A - B) = $\frac{1}{2}$, 0 < A + B $\leq 90^o$ and A > B, then find the values of A and B. **[1]**

42. If $\sqrt{3}$ tan θ = 3 sin θ, find the value of sin θ **[1]**

43. If cosec $\theta = \frac{5}{4}$, find the value of cot θ. **[1]**

44. If A, B, C are the interior angles of a triangle ABC, prove that: $\tan\frac{B+C}{2} = \cot\frac{A}{2}$. **[1]**

45. If tan $\theta = \sqrt{3}$, find the value of $\left(\frac{2\sec\theta}{1+\tan^2\theta}\right)$. **[1]**

46. If 3 sin A = 1, then find the value of sec A. **[1]**

Section B

47. **Fill in the blanks:** **[4]**

(a) In right angled triangle, the square of the _____ is equal to the sum of the squares of the other two sides. **[1]**

(b) The ratio of the sides of a right triangle with respect to its acute angles, are called _____. **[1]**

(c) If $\sin\theta = \frac{24}{25}$, then the value of $\sin^2\theta + \cos^2\theta$ is _____. **[1]**

(d) The maximum value of $\frac{1}{\sec\theta}$ is _____. **[1]**

Section C

48. If $\sin A = \frac{8}{17}$, find other trigonometric ratios of $\angle A$. **[5]**

49. If $\cos\theta = \frac{3}{5}$, find the value of $\frac{\sin\theta - \frac{1}{\tan\theta}}{2\tan\theta}$. **[5]**

50. If $\sec\theta = \frac{13}{5}$, show that $\frac{2\sin\theta - 3\cos\theta}{4\sin\theta - 9\cos\theta} = 3$. **[5]**

51. If $\cot\theta = \frac{7}{8}$, evaluate. **[5]**

i. $\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$

ii. $\cot^2\theta$

52. If $\sec A = \frac{5}{4}$, verify that $\frac{3\sin A - 4\sin^3 A}{4\cos^3 A - 3\cos A} = \frac{3\tan A - \tan^3 A}{1 - 3\tan^2 A}$. **[5]**

53. If $\cos\theta = \frac{5}{13}$, find the value of $\frac{\sin^2\theta - \cos^2\theta}{2\sin\theta\cos\theta} \times \frac{1}{\tan^2\theta}$ **[5]**

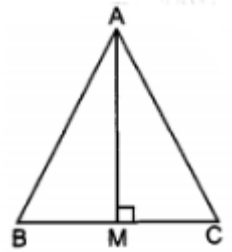
54. If $\cot\theta = \frac{1}{\sqrt{3}}$, show that $\frac{1-\cos^2\theta}{2-\sin^2\theta} = \frac{3}{5}$ **[5]**

55. If sec $\theta = \frac{5}{4}$, verify that $\frac{\tan\theta}{1+\tan^2\theta} = \frac{\sin\theta}{\sec\theta}$. **[5]**

56. If 3 cot A = 4, check whether $\frac{1-\tan^2 A}{1+\tan^2 A} = \cos^2 A - \sin^2 A$ or not. **[5]**

57. In $\triangle ABC$, right angled at C, if, $\tan A = \frac{1}{\sqrt{3}}$. find the value of sin A cos B+ cos A sin B **[5]**

58. In the given figure, $AM \perp BC$, if tan B = $\frac{3}{4}$, tan C = $\frac{5}{12}$ and BC = 56 cm, find the length of AM. **[5]**



59. In a △ABC, ∠B = 90°, AB = 5 cm and (BC + AC) = 25 cm. Find the values of sin A, cos A, cosec C and sec C. **[5]**

60. Prove that: $\frac{(1+\cot\theta+\tan\theta)(\sin\theta-\cos\theta)}{(\sec^3\theta-\text{cosec}^3\theta)} = \sin^2\theta\cos^2\theta$ **[5]**

61. △RPQ is a triangle, right-angled at Q. If PQ = 5 cm and RQ = 10 cm, find: **[5]**

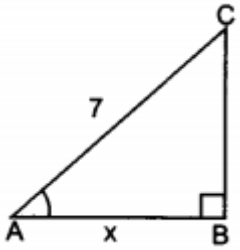
i. sin P

ii. $\cos^2$R and tan R

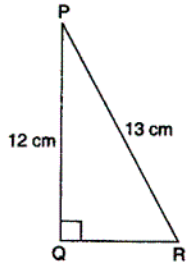
iii. sin P × cos P

iv. $\sin^2$P - $\cos^2$P

62. In △ABC, AB = x units, AC = 7 units, and $\angle B = 90^\circ$, cos B = 0. Evaluate : $\sqrt{7-x}$ tan C + $\sqrt{7+x}$ cot A - 14 cos A + 21 sin C + $\sqrt{49+x^2}$ cos B. **[5]**



63. In figure, find tan P - cot R. **[5]**



Section D

64. **State True or False:** **[9]**

(a) "tan A" in terms of perpendicular and base is $\frac{Base}{Perpendicular}$. **[1]**

(b) cot A is the product of cot and A. **[1]**

(c) The value of tan A is always less than 1. **[1]**

(d) If $\tan\theta = \frac{a}{b}$, then the value of secθ is $\frac{\sqrt{a^2+b^2}}{b}$. **[1]**

(e) sinθ = $\frac{4}{3}$ for some $\angle\theta$. **[1]**

(f) $\sin\theta = \frac{4}{3}$ for some angle θ. **[1]**

(g) sinθ in terms of secθ is $\frac{\sqrt{sec^2\theta-1}}{sec\theta}$. **[1]**

(h) sec A = $\frac{12}{5}$ for some value of $\angle A$. **[1]**

(i) cos A is the abbreviation used for the cosecant of $\angle A$. **[1]**