Work Sheet for class- Ten (Girls)
Chapter-9
Exercise-9.1
Trigonometric Ratio

Creative Multiplication Choice Questions

1. In case of Trigonometric ration -
   [D.B.- 19]
   i. $\tan 30° \cot 30° = 1$
   ii. $\sec^2 60° - \tan^2 60° = 1$
   iii. $\tan \theta \sqrt{1 - \sin^2 \theta} = \sin \theta$
   Which one of the following is correct?
   a) i and ii
   b) i and iii
   c) ii and iii
   d) i, ii and iii

2. If $\operatorname{cosec}\theta + \cot\theta = \frac{1}{2}$ then $\operatorname{cosec}\theta - \cot\theta =$ **What?**
   [R.B.- 19]
   a) 2
   b) 1
   c) −1
   d) −2

3. If $\tan\theta = \frac{3}{4}$ then $sec^2\theta =$ **What?**
   [R.B.- 19]
   a) $\frac{9}{16}$
   b) $\frac{16}{25}$
   c) $\frac{25}{16}$
   d) $\frac{9}{25}$

4. In $\Delta PQR, \angle Q = 1$ right angle, $\angle PRQ = 60°$ and $PQ = 8\,cm$ then $QR =$ **What?**
   [R.B.- 19]
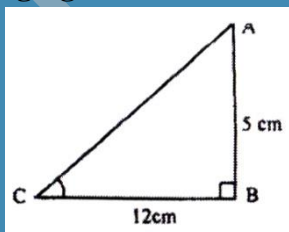   a) 4 cm
   b) $4\sqrt{3}$ cm
   c) $4\sqrt{5}$ cm
   d) 16 cm

5. In $\tan A = 1$ then what is value of $cosA$?
   [C.B.- 19]
   a) $\frac{1}{\sqrt{2}}$
   b) $\frac{1}{2}$
   c) $\sqrt{2}$
   d) 2

Answer the questions no. (6 − 7) from the following figure:

6. What is the value of $cosC =$ **What?**
   [C.B.- 19]
   a) $\frac{5}{13}$
   b) $\frac{12}{13}$
   c) $\frac{13}{12}$
   d) $\frac{13}{5}$

7. $\cot A + \tan C =$ **What?**
   [C.B.- 19]
   a) $\frac{5}{6}$
   b) $\frac{3}{2}$
   c) $\frac{181}{65}$
   d) $\frac{169}{60}$

8. $\sec\theta\sqrt{1 - \cos^2\theta} =$ **What?**
   [C.B.- 19]
   a) $\operatorname{Sin}\theta$
   b) $\cos\theta$
   c) $\tan\theta$
   d) $\cot\theta$

9. In $\cot\theta - \operatorname{cosec}\theta = \frac{4}{3}$ then the value of $\operatorname{cosec}\theta + \cot\theta =$ **What?** [S.B.- 19, R.B.- 16]
   a) $-\frac{3}{4}$
   b) $-\frac{4}{3}$
   c) $\frac{4}{3}$
   d) $\frac{3}{4}$

10. If $A = 30°$ then what is value of $\tan A . \tan 2A$.
    [J.B.- 19]
    a) 0
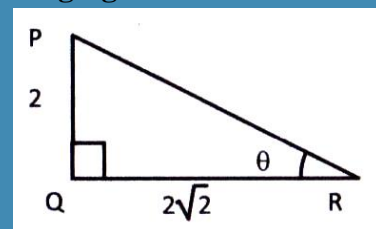   b) $\frac{1}{\sqrt{3}}$
    c) $\sqrt{3}$
    d) 1

11. If $A = 15°$ then -
    [Ctg.B.- 19]
    i. $\tan 3A = \sqrt{2} \sin 3A$
    ii. $\cot 4A = \frac{1}{\sqrt{3}}$
    iii. $\sin 4A = \cos 2A$
    Which one of the following is correct?
    a) i and ii
    b) i and iii
    c) ii and iii
    d) i, ii and iii

Answer the questions no. (12 − 13) from the following figure:

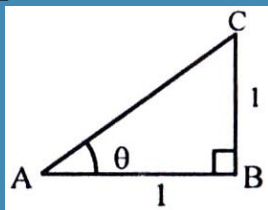12. Which one of the following is the value of $\cos \theta =$ **What?**
    [Ctg.B.- 19]
    a) $\frac{1}{\sqrt{2}}$
    b) $\sqrt{\frac{2}{3}}$
    c) $\sqrt{\frac{3}{2}}$
    d) $\frac{\sqrt{3}}{2}$

13. Which one of the following is the value of $\frac{\tan^2\theta + 1}{\operatorname{cosec}^2\theta - 1} =$ **What?**
    [Ctg.B.- 19]
    a) $\frac{3}{4}$
    b) $\frac{4}{3}$
    c) $\frac{3}{2}$
    d) $\frac{9}{4}$

14. If $\tan A = \frac{4}{3}$ then what is the value of $\sec A$? **[All B.- 18]**

   a) $\frac{3}{4}$ b) $\frac{4}{5}$

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

15. In case of Trigonometry- **[All B.- 18]**

  i. $\sec^2\theta + \tan^2\theta = 1$

  ii. $\cot^2\theta = 1 + \csc^2\theta$

  iii. $\cos^2\theta = 1 - \sin^2\theta$

  Which one of the following is correct?

   a) I   b) iii

   c) ii and iii   d) i, ii and iii

16. If $\tan\theta = \frac{4}{3}$ then $\csc\theta = $ What?

                                   [D.B.- 17]

   a) $\frac{4}{3}$ b) $\frac{5}{4}$

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

17.

What is the value of $\tan\theta$? **[Ctg.B.- 17]**

   a) $\frac{3}{5}$ b) $\frac{3}{4}$

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

18. If $\tan\theta = \frac{5}{2}$ then what is the value of $\cot^2\theta$? **[S.B.- 17]**

   a) $\frac{29}{4}$ b) $\frac{25}{4}$

   c) $\frac{4}{25}$ d) $\frac{4}{29}$

19. In trigonometry relation- **[S.B.- 17]**

  i. $\sin(90° - \theta) = \sin\theta$

  ii. $\sec^2\theta - \tan^2\theta = 1$

  iii. $\sin^2\theta + \cos^2\theta = 1$

  Which one of the following is correct?

   a) i and ii   b) i and iii

   c) ii and iii   d) i, ii and iii

20.

According to figure then what is the value of BC? **[D.B.- 16]**

   a) 1.118 m   b) 1.811m

   c) 2.236 m   d) 4.472 m

21. If $\sin\theta = \frac{\sqrt{3}}{2}$ then what is the value of $\tan\theta$? **[D.B.- 16]**

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

   c) $\frac{\sqrt{3}}{\sqrt{7}}$ d) $\frac{1}{\sqrt{3}}$

22. If $\csc\theta = \frac{a}{b}$ then what is the value of $\tan\theta$? **[D.B.- 16]**

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

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

23. What is the value of $\sec 45° \div \cos 45°$? **[S.B.- 16]**

   a) $-\sqrt{2}$ b) -1

   c) 1   d) 2

24. What is the value of $\sec^2\theta - \tan^2\theta + \frac{1}{2}$? **[S.B.- 16]**

   a) $-\frac{3}{2}$ b) $-\frac{1}{2}$

   c) $\frac{1}{2}$ d) $\frac{3}{2}$

Answer the questions No. (25 – 26) according to the following figure:

25. What is the value of $\tan\theta_1$? **[Ctg.B.- 16]**

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

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

26. $\sin\theta_2 = $ What? **[Ctg.B.- 16]**

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

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

According to the figure below answer to the questions no. (27 – 28):

27. The value of $\sin\theta$ = What? [J.B.- 16]
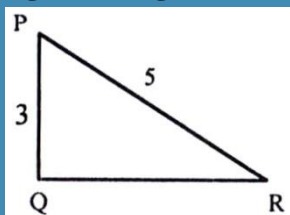   a) $\frac{1}{\sqrt{2}}$ 　　　b) $\frac{1}{2}$
   c) 1 　　　d) $\sqrt{2}$

28. In figure – [J.B.- 16]
   i. $AC = \sqrt{2}$
   ii. $\tan\theta = 1$
   iii. $\csc^2\theta - \cot^2\theta = 1$
   Which one of the following is correct?
   a) i and ii 　　　b) i and iii
   c) ii and iii 　　　d) i, ii and iii

Answer to the question no. (29 – 30) according to the figure:

29. What is the value of $\cos\theta$? [R.B.- 15]
   a) $\frac{3}{5}$ 　　　b) $\frac{3}{4}$
   c) $\frac{4}{5}$ 　　　d) $\frac{5}{4}$

30. Which one is the value of $\frac{\tan^2\theta + 1}{\sin^2\theta - 1}$? [R.B.- 15]
   a) $\frac{-35}{8}$ 　　　b) -2.44
   c) -1 　　　d) 1.56

31. What is the mutual relation of trigonometric ratios of acute angle? [D.B.- 15]
   a) $\cot\theta = \frac{\sin\theta}{\cos\theta}$ 　　b) $\sin\theta = \frac{1}{\sec\theta}$
   c) $\tan\theta = \frac{\sin\theta}{\cos\theta}$ 　　d) $\cot\theta = \frac{1}{\csc\theta}$

32.
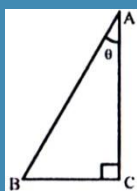
In the above figure $\cos\theta$- [D.B.- 15]
   a) $\frac{AC}{AB}$ 　　　b) $\frac{BC}{AB}$
   c) $\frac{AB}{BC}$ 　　　d) $\frac{AB}{AC}$

33. Which law is correct? [R.B.- 15]
   a) $\tan^2\theta = 1 - \sec^2\theta$
   b) $\csc^2\theta - \tan^2\theta = 1$
   c) $\sin^2\theta - \cos^2\theta = 1$
   d) $\frac{1}{\csc^2\theta} + \frac{1}{\sec^2\theta} = 1$

34. If $\tan\theta = \frac{3}{4}$ than $\cos^2\theta$ = What? [Ctg.B.- 15]
   a) $\frac{16}{9}$ 　　　b) $\frac{25}{60}$
   c) $\frac{9}{16}$ 　　　d) $\frac{16}{25}$

35. If $\sec\theta + \tan\theta = \frac{5}{2}$ than $\sec\theta - \tan\theta$ = What? [S.B.- 15]
   a) $\frac{2}{3}$ 　　　b) $\frac{3}{5}$
   c) $\frac{5}{6}$ 　　　d) $\frac{4}{5}$

36. In $\triangle ABC, \angle B = 90°$, $AB = 3$ cm, $BC = 4$ cm. What is the value of $\sin C$? [J.B.- 15]
   a) $\frac{5}{3}$ 　　　b) $\frac{4}{50}$
   c) $\frac{3}{4}$ 　　　d) $\frac{3}{5}$

37. $\csc\theta + \cot\theta = \frac{5}{6}$ than $\csc\theta - \cot\theta$ = What? [B.B.- 15]
   a) $\frac{1}{6}$ 　　　b) $\frac{5}{6}$
   c) 1 　　　d) $\frac{6}{3}$

38. In trigonometry ratio – [Ctg.B.- 15]
   i. $\csc^2\theta = 1 - \cot^2\theta$
   ii. $\sec^2\theta - \tan^2\theta = 1$
   iii. $\cos^2\theta = 1 - \sin^2\theta$
   Which one of the following is correct?
   a) li 　　　b) iii
   c) ii and iii 　　　d) i, ii and iii

39. In the relation trigonometry [B.B.- 15]
   i. $\sin^2\theta = 1 - \cos^2\theta$
   ii. $\sec^2\theta = 1 + \tan^2\theta$
   iii. $\csc^2\theta = 1 - \tan^2\theta$
   Which one of the following is correct?
   a) i and ii 　　　b) i and iii
   c) ii and iii 　　　d) i, ii and iii

40. In trigonometry ratio – [C.B.- 15]
   i. $\sin^2\theta = 1 + \cos^2\theta$

ii. $\sec^2 \theta = 1 + \tan^2 \theta$

iii. $\csc^2\theta = 1 + \cot^2 \theta$

Which one of the following is correct?

   a) i and ii   b) i and iii

   c) ii and iii   d) i, ii and iii

41. **How many trigonometric functions can possibly define in any right triangle?**

   a) 6   b) 5

   c) 4   d) 3

42. $\dfrac{1}{cosecA - 1} - \dfrac{1}{coseA + 1} =$ **What?**

   a) $2\sin^2 A$ b) $2\cos^2 A$

   c) $2\tan^2 A$ d) $2\cot^2 A$

43. $\cos A\sqrt{\sec^2 A - 1} =$ **What?**

   a) 1   b) cosA

   c) sinA   d) cosA. cotA

44. **If** $cosecA + cotA = \dfrac{1}{2}$ **than** $cosecA + cotA =$ **What?**

   a) $\dfrac{1}{2}$ b) 1

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

45. **If** $\tan\theta = \dfrac{4}{3}$ **then what is the value of** $cosec\theta$?

   a) $\dfrac{5}{4}$ b) $\dfrac{4}{5}$

   c) $\dfrac{3}{5}$ d) $\dfrac{3}{4}$

46. $\sin\theta\sqrt{cosec^2\theta - 1} =$ **What?**

   a) $\sin\theta\cos\theta$ b) $\sin\theta$

   c) $\cos\theta$ d) 1

47. **If** $\cot\theta = \dfrac{x}{y}$ **then** $cosec\theta =$ **What?**

   a) $\dfrac{y}{x^2 + y^2}$ b) $\dfrac{\sqrt{x^2 - y^2}}{y}$

   c) $\dfrac{y}{\sqrt{x^2 - y^2}}$ d) $\dfrac{\sqrt{x^2 + y^2}}{y}$

48. **If** $\sin\theta = \dfrac{5}{13}$ **and** $\dfrac{\pi}{2} < \theta < \pi$ **then** $\dfrac{\tan\theta + \sec(-\theta)}{\cot\theta + cosec(-\theta)} =$ **What?**

   a) $-\dfrac{3}{10}$ b) $\dfrac{10}{3}$

   c) $\dfrac{118}{255}$ d) $\dfrac{3}{10}$

49. **If** $5\tan\theta = 4$ **then** $\dfrac{5\sin\theta - 3\cos\theta}{\sin\theta + 2\cos\theta} =$ **What?**

   a) $\dfrac{6}{14}$ b) $\dfrac{5}{14}$

   c) $\dfrac{1}{8}$ d) $\dfrac{14}{5}$

50. **If** $\cot\theta = \dfrac{4}{3}$ **then** $\cot\theta. \tan\theta. \cos\theta =$ **What?**

   a) $\dfrac{3}{5}$ b) $\dfrac{4}{5}$

   c) $\dfrac{5}{3}$ d) 1

Creative Questions:

1. $2\cos (A + B) = 1 = 2\sin(A - B)$, $\cot\theta + \cos\theta = m$ **and** $\cot\theta - \cos\theta = n.$

                          [D.B.- 19]

   a) If $\tan C = \dfrac{3}{4}$ then find the value of $\sec C$.

   b) Determine the value of $cosec\ 2A$.

   c) Prove that, $m^2 - n^2 = 4\sqrt{mn}$.

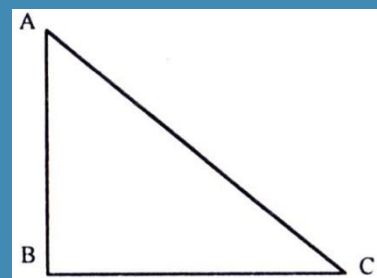**2.** $secB = x$, $\tan B = y$ **and** $cosecA - cotA = \dfrac{4}{3}$ **where A and B are acute angle.**

                          [Dj.B.- 19]

   a) If $cosec\theta = 2$ then find the value of θ.

   b) If $\dfrac{x - y}{x + y} = \dfrac{2 - \sqrt{3}}{\sqrt{3} + 2}$ then show that, $B = 60°$.

   c) Determine the value of $(\sin A + \cos A)$ from the information given in the stem.

3. $\angle C$ **is the right angle of a triangle ABC** $\tan B = \sqrt{3}$.   **[All B.- 18]**

   a) Find the length of AB.

   b) According to the stem prove that, $\dfrac{\cot A + \tan B}{\cot B + \tan A} = \cot A \tan B$.

   c) If $\angle B = m + n$ and $\angle A = m - n$ then find the value of m and n.

4.

$AB = a$, $AC = \sqrt{a^2 + b^2}$ **and** $\angle C = \theta.$

                          [Ctg.B.- 17]

a) Find the trigonometric ratio of $\tan\theta$ from the figure.

b) Use the value of $\tan\theta$ then find the value of $\frac{a\sin\theta - b\cos\theta}{a\sin\theta + b\cos\theta}$.

c) If tanA + sinA = m and tanA - sinA = n then Prove that, $m^2 - n^2 = 4\sqrt{mn}$.

Basic Information:

❖ Bartholomaeus Pitiscus (1561 – 1613) was a German Trigonometrician, Astronomist and Theologist.

❖ His famous writing is "Ca: sive de solution triangulorum tractatus brevis et perspicuous".

❖ He first uses this word Trigonometry.

❖ He developed Trigonometric table of Rheticus.

➢ Muhammad Ibn Musa Al-Khwarizmi (780 -850) was a Physicist, Astrophysicist and Geographer.

➢ Algebra word was taken from his book Al Jabr Wa Al Muqabalah.

➢ This is the first book of algebra where Linear and Quadratic Equations are solved.

➢ He invented Sine and Cosine function table.

✓ One of the ancient topics of Mathematics is Trigonometry.

✓ It's been used in Astrophysics since ancient time.

✓ It was first used in Shadow Stick, which is used to measure velocity of Sun and Time.

✓ Later on, many Clocks were invented using Trigonometry which cloud be used to determine Time by Stars.

- ✓ For example, Gonon Circle, Merkhet etc.
- ✓ Trigonometry is also used for Altitude and Longitude measurement.
- ✓ Concept of trigonometry helped Astrophysicists to determine Season, which helped them prevent Flood, Draught, Cyclone etc.