

Work Sheet for class- Nine (Girls)

Chapter-9

Exercise-9.1

Trigonometric Ratio

Creative Multiplication Choice Questions

1. In case of Trigonometric rati^on -

[D.B.- 19]

- i. $\tan 30^\circ \cot 30^\circ = 1$
- ii. $\sec^2 60^\circ - \tan^2 60^\circ = 1$
- 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 ΔPQR , $\angle Q = 1$ right angle, $\angle PRQ = 60^\circ$ and $PQ = 8$ cm then $QR =$ What?

[R.B.- 19]

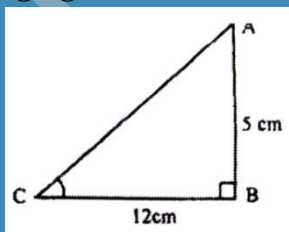
- a) 4 cm
- b) $4\sqrt{3}$ cm
- c) $4\sqrt{5}$ cm
- d) 16 cm

5. In $\tan A = 1$ then what is value of $\cos A$?

[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 $\cos C =$ 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) $\sin \theta$
- 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 $A = 30^\circ$ then what is value of $\tan A \cdot \tan 2A$. [J.B.- 19]

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

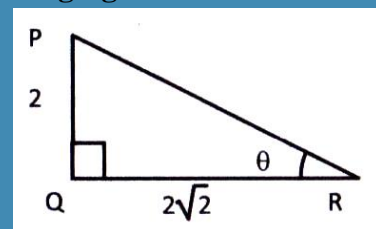
11. If $A = 15^\circ$ then - [Ctg.B.- 19]

- 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]

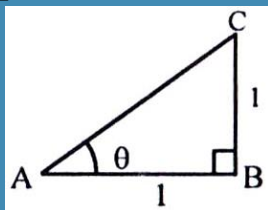
- a) $\frac{1}{\sqrt{2}}$
- b) $\sqrt{\frac{2}{3}}$
- c) $\sqrt{\frac{3}{2}}$
- d) $\frac{\sqrt{3}}{2}$

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) $\frac{9}{4}$

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) $\sqrt{2}$

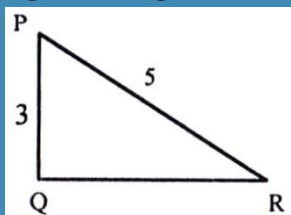
28. In figure – [J.B.- 16]

- i. $AC = \sqrt{2}$
 ii. $\tan\theta = 1$
 iii. $\operatorname{cosec}^2\theta - \cot^2\theta = 1$

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]

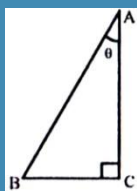
- a) $-\frac{35}{8}$ b) -2.44
 c) -1 d) 1.56

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

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) $\operatorname{cosec}^2\theta - \tan^2\theta = 1$
 c) $\sin^2\theta - \cos^2\theta = 1$
 d) $\frac{1}{\operatorname{cosec}^2\theta} + \frac{1}{\sec^2\theta} = 1$

34. If $\tan\theta = \frac{3}{4}$ then $\cos^2\theta =$ What?

[Ctg.B.- 15]

- a) $\frac{16}{9}$ b) $\frac{25}{60}$
 c) $\frac{9}{16}$ d) $\frac{16}{25}$

35. If $\sec\theta + \tan\theta = \frac{5}{2}$ then $\sec\theta - \tan\theta =$ What? [S.B.- 15]

- a) $\frac{2}{3}$ b) $\frac{3}{5}$
 c) $\frac{5}{6}$ d) $\frac{4}{5}$

36. In $\triangle ABC$, $\angle B = 90^\circ$, $AB = 3$ 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. $\operatorname{cosec}\theta + \cot\theta = \frac{5}{6}$ then $\operatorname{cosec}\theta - \cot\theta =$ 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. $\operatorname{cosec}^2\theta = 1 - \cot^2\theta$
 ii. $\sec^2\theta - \tan^2\theta = 1$
 iii. $\cos^2\theta = 1 - \sin^2\theta$

Which one of the following is correct?

- a) ii 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. $\operatorname{cosec}^2\theta = 1 - \tan^2\theta$

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

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. $\frac{1}{\operatorname{cosec}A - 1} - \frac{1}{\operatorname{cosec}A + 1} = \text{What?}$

- a) $2 \sin^2 A$ b) $2 \cos^2 A$
c) $2 \tan^2 A$ d) $2 \cot^2 A$

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

- a) 1 b) $\cos A$
c) $\sin A$ d) $\cos A \cdot \cot A$

44. If $\operatorname{cosec}A + \cot A = \frac{1}{2}$ then $\operatorname{cosec}A + \cot A = \text{What?}$

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

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

- a) $\frac{5}{4}$ b) $\frac{4}{5}$
c) $\frac{3}{5}$ d) $\frac{3}{4}$

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

- a) $\sin\theta \cos\theta$ b) $\sin\theta$
c) $\cos\theta$ d) 1

47. If $\cot\theta = \frac{x}{y}$ then $\operatorname{cosec}\theta = \text{What?}$

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

48. If $\sin\theta = \frac{5}{13}$ and $\frac{\pi}{2} < \theta < \pi$ then

$\frac{\tan\theta + \sec(-\theta)}{\cot\theta + \operatorname{cosec}(-\theta)} = \text{What?}$

- a) $-\frac{3}{10}$ b) $\frac{10}{3}$
c) $\frac{118}{255}$ d) $\frac{3}{10}$

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

- a) $\frac{6}{14}$ b) $\frac{5}{14}$
c) $\frac{1}{8}$ d) $\frac{14}{5}$

50. If $\cot\theta = \frac{4}{3}$ then $\cot\theta \cdot \tan\theta \cdot \cos\theta = \text{What?}$

- a) $\frac{3}{5}$ b) $\frac{4}{5}$
c) $\frac{5}{3}$ 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 $\tan C = \frac{3}{4}$ then find the value of $\sec C$.
b) Determine the value of $\operatorname{cosec} 2A$.
c) Prove that, $m^2 - n^2 = 4\sqrt{mn}$.

2. $\sec B = x$, $\tan B = y$ and $\operatorname{cosec} A - \cot A = \frac{4}{3}$ where A and B are acute angle.

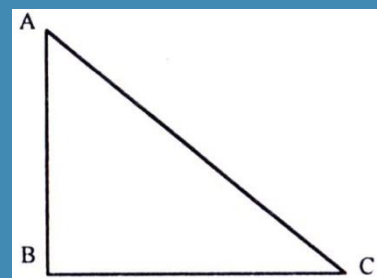
[Dj.B.- 19]

- a) If $\operatorname{cosec}\theta = 2$ then find the value of θ .
b) If $\frac{x-y}{x+y} = \frac{2-\sqrt{3}}{\sqrt{3}+2}$ then show that, $B = 60^\circ$.
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, $\frac{\cot A + \tan B}{\cot B + \tan A} = \cot A \tan B$.
c) If $\angle B = m + n$ and $\angle A = m - n$ then find the value of m and n .

4.

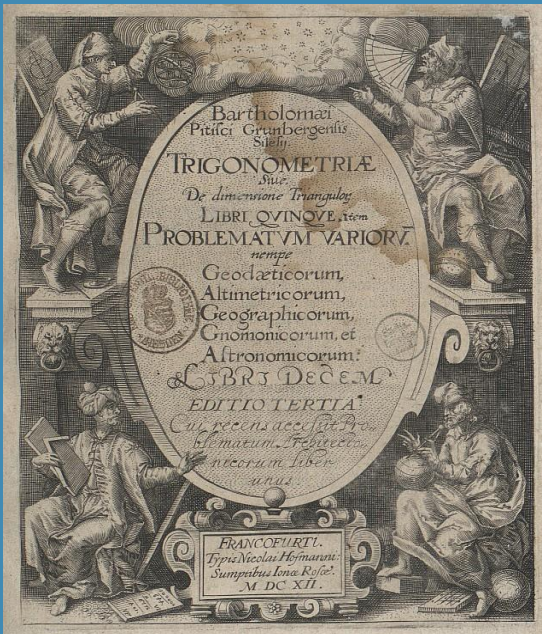


$AB = a, AC = \sqrt{a^2 + b^2}$ and $\angle C = \theta$.

[Ctg.B.- 17]

- Find the trigonometric ratio of $\tan\theta$ from the figure.
- Use the value of $\tan\theta$ then find the value of $\frac{a \sin \theta - b \cos \theta}{a \sin \theta + b \cos \theta}$.
- If $\tan A + \sin A = m$ and $\tan A - \sin A = n$ 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 “Casus de solutione triangulorum tractatus brevis et perspicuus”.
- ❖ 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 could 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.

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