INTRODUCTION TO TRIGONOMETRY

MCQs & A and R WORK SHEET

Test / Exam Name: Introduction To Trigonometry **Standard: 10th** **Subject: Mathematics**

Student Name: ..... **Section:** ..... **Roll No.:** .....

Questions: 35 **Time: 01:00 hh:mm** **Negative Marks: 0** **Marks: 35**

Instructions

1. MULTIPLE CHOICE QUESTIONS.

Q1. Choose the correct answer from the given four options. **1 Mark**

Given that $\sin\theta = \frac{a}{b}$, then $\cos\theta$ is equal to:

A $\frac{b}{\sqrt{b^2-a^2}}$ **B** $\frac{b}{a}$ **C** $\frac{\sqrt{b^2-a^2}}{b}$ **D** $\frac{a}{\sqrt{b^2-a^2}}$

Ans: C $\frac{\sqrt{b^2-a^2}}{b}$

Solution:

Given, $\sin\theta = \frac{a}{b}$ [$\because \sin^2\theta + \cos^2\theta = 1 \Rightarrow \cos\theta = \sqrt{1-\sin^2\theta}$]

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

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

Q2. $(\text{cosec}\ \theta - \cot\theta)^2 = ?$ **1 Mark**

A $\frac{1+\cos\theta}{1-\cos\theta}$ **B** $\frac{1-\cos\theta}{1+\cos\theta}$ **C** $\frac{1+\sin\theta}{1-\sin\theta}$ **D** None of these.

Ans: B $\frac{1-\cos\theta}{1+\cos\theta}$

Solution:

$(\text{cosec}\ \theta - \cot\theta)^2 = \left(\frac{1}{\sin\theta} - \frac{\cos\theta}{\sin\theta}\right)^2$

$= \left(\frac{1-\cos\theta}{\sin\theta}\right)^2$

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

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

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

$= \frac{1-\cos\theta}{1+\cos\theta}$

Q3. Choose the correct option and justify your choice: **1 Mark**

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

A $\tan 90^\circ$ **B** 1 **C** $\sin 45^\circ$ **D** 0

Ans: D 0

4. 0

$= \frac{1-\tan^2 45^\circ}{1+\tan^2 45^\circ} = \frac{1-1}{1+1} = 0$

Q4. If $\theta = 45$ then $\frac{2\tan\theta}{1+\tan^2\theta}$ is: **1 Mark**

A 1 **B** 0 **C** 2 **D** 3

Ans: A 1

Solution:

$\frac{2\tan\theta}{1+\tan^2\theta}$

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

$= \frac{2\times1}{1+1} = \frac{2}{2} = 1$

Q5. If $3x = \text{cosec}\theta$ and $\frac{3}{x} = \cot\theta$ then $3\left(x^2 - \frac{1}{x^2}\right) = ?$ **1 Mark**

A $\frac{1}{27}$ **B** $\frac{1}{81}$ **C** $\frac{1}{3}$ **D** $\frac{1}{9}$

Ans: C $\frac{1}{3}$

Solution:

We know that

$\text{cosec}^2\theta - \cot^2\theta = 1$

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

$\Rightarrow 9x^2 - \frac{9}{x^2} = 1$

$\Rightarrow 9\left(x^2 - \frac{1}{x^2}\right) = 1$

$\Rightarrow \left(x^2 - \frac{1}{x^2}\right) = \frac{1}{9}$

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

Q6. The value of $\tan45^\circ \times \cot45^\circ$ is: **1 Mark**

A 0 **B** 1 **C** 2 **D** $\frac{1}{2}$

Ans: B 1

Solution:

$\tan45^\circ \times \cot45^\circ = 1 \times 1 = 1$

Q7. If $\cot\theta = \frac{7}{8}$ then the value of $\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$ is: **1 Mark**

A $\frac{8}{7}$ **B** $\frac{49}{64}$ **C** $\frac{7}{8}$ **D** $\frac{64}{49}$

Ans: B $\frac{49}{64}$

Solution:

Given: $\cot\theta = \frac{7}{8}$

Now, $\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$

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

$= \left(\frac{7}{8}\right)^2$

$= \frac{49}{64}$

Q8. Choose the correct answer from the given four options. **1 Mark**

If $\cos A = \frac{4}{5}$, then the value of tanA is:

A $\frac{3}{5}$ **B** $\frac{3}{4}$ **C** $\frac{4}{3}$ **D** $\frac{5}{3}$

Ans: B $\frac{3}{4}$

Solution:

Given, $\cos A = \frac{4}{5}$

$\therefore \sin A = \sqrt{1 - \cos^2 A}$ $\left[\because \sin^2 A + \cos^2 A = 1 \;\Rightarrow\; \therefore \sin A = \sqrt{1 - \cos^2 A}\right]$

$= \sqrt{1 - \left(\frac{4}{5}\right)^2} = \sqrt{1 - \frac{16}{25}} = \sqrt{\frac{9}{25}} = \frac{3}{5}$

Now, $\tan A = \frac{\sin A}{\cos A} = \frac{\frac{3}{5}}{\frac{4}{5}} = \frac{3}{4}$

Hence, the required value of tanA is $\frac{3}{4}$.

Q9. $\sqrt{\frac{1-\sin A}{1+\sin A}} = ?$ **1 Mark**

A secA + tanA **B** secA − tanA **C** secAtanA **D** None of these.

Ans: B secA − tanA

Solution:

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

$$= \sqrt{\frac{(1-\sin A)^2}{1-\sin^2 A}}$$

$$= \sqrt{\frac{(1-\sin A)^2}{\cos^2 A}}$$

$$= \frac{1-\sin A}{\cos A}$$

$$= \frac{1}{\cos A} - \frac{\sin A}{\cos A}$$

$$= \sec A - \tan A$$

Q10. If $2x = \sec A$ and $\frac{2}{x} = \tan A$ then $2\left(x^2 - \frac{1}{x^2}\right) = ?$ **1 Mark**

A $\frac{1}{2}$ **B** $\frac{1}{4}$ **C** $\frac{1}{8}$ **D** $\frac{1}{16}$

Ans: A $\frac{1}{2}$

Solution:

We know that

$\sec^2 A - \tan^2 A = 1$

$$\Rightarrow (2x)^2 - \left(\frac{2}{x}\right)^2 = 1$$

$$\Rightarrow 4x^2 - \frac{4}{x^2} = 1$$

$$\Rightarrow 4\left(x^2 - \frac{1}{x^2}\right) = 1$$

$$\Rightarrow \left(x^2 - \frac{1}{x^2}\right) = \frac{1}{4}$$

$$\Rightarrow 2\left(x^2 - \frac{1}{x^2}\right) = \frac{1}{2}$$

Q11. Choose the correct option and justify your choice: **1 Mark**

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

A $\cos 60^\circ$ **B** $\sin 60^\circ$ **C** $\tan 60^\circ$ **D** $\sin 30^\circ$

Ans: C $\tan 60^\circ$

3. $\tan 60^\circ$

$$\frac{2\tan 30^\circ}{1-\tan^2 30^\circ} = \frac{2 \times \frac{1}{\sqrt{3}}}{1-\left(\frac{1}{\sqrt{3}}\right)^2} = \frac{\frac{2}{\sqrt{3}}}{\frac{3-1}{3}}$$

$$= \frac{\frac{2}{\sqrt{3}}}{\frac{2}{3}}$$

$$= \frac{2}{\sqrt{3}} \times \frac{3}{2}$$

$$= \frac{3}{\sqrt{3}}$$

$$= \frac{3}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$$

$$= \frac{3\sqrt{3}}{3} = \sqrt{3} = \tan 60^\circ$$

Q12. If $x\tan 45^\circ \cos 60^\circ = \sin 60^\circ \cot 60^\circ$, then x is equal to: **1 Mark**

A 1 **B** $\sqrt{3}$ **C** $\frac{1}{2}$ **D** $\frac{1}{\sqrt{2}}$

Ans: A 1

Solution:

$x\tan 45^\circ \cos 60^\circ = \sin 60^\circ \cot 60^\circ$

$\Rightarrow x \times 1 \times \frac{1}{2} = \frac{\sqrt{3}}{2} \times \frac{1}{\sqrt{3}}$

$\Rightarrow \frac{x}{2} = \frac{1}{2}$

$\Rightarrow x = 1$

Hence the correct option is (a)

Q13. What is the value of $\sin 30° \times \operatorname{cosec} 30°$? **1 Mark**

A 1 **B** 0 **C** $\frac{1}{2}$ **D** 2

Ans: A 1

Solution:

$\mathbf{\sin 30° \times \operatorname{cosec} 30° = \frac{1}{2} \times \frac{2}{1} = \frac{1}{1} = 1}$

Q14. If $x = r\sin\theta\cos\phi$, $y = r\sin\phi$ and $z = r\cos\theta$, then: **1 Mark**

A $x^2 + y^2 + z^2 = r^2$ **B** $x^2 + y^2 - z^2 = r^2$ **C** $x^2 - y^2 + z^2 = r^2$ **D** $z^2 + y^2 - x^2 = r^2$

Ans: A $x^2 + y^2 + z^2 = r^2$

Solution:

$x = r\sin\theta\cos\phi$

$y = r\sin\theta\sin\phi$

$z = r\cos\theta$

Squaring and adding these equations, we get

$x^2 + y^2 + z^2 = (r\sin\theta\cos\phi)^2 + (r\sin\theta\sin\phi)^2 + (r\cos\theta)^2$

$\Rightarrow x^2 + y^2 + z^2 = r^2\sin^2\theta\cos^2\phi + r^2\sin^2\theta\sin^2\phi + r^2\cos^2\theta$

$\Rightarrow x^2 + y^2 + z^2 = (r^2\sin^2\theta\cos^2\phi + r^2\sin^2\theta\sin^2\phi) + r^2\cos^2\theta$

$\Rightarrow x^2 + y^2 + z^2 = r^2\sin^2\theta(\cos^2\phi + \sin^2\phi) + r^2\cos^2\theta$

$\Rightarrow x^2 + y^2 + z^2 = r^2\sin^2\theta(1) + r^2\cos^2\theta$

$\Rightarrow x^2 + y^2 + z^2 = r^2\sin^2\theta + r^2\cos^2\theta$

$\Rightarrow x^2 + y^2 + z^2 = r^2(\sin^2\theta + \cos^2\theta)$

$\Rightarrow x^2 + y^2 + z^2 = r^2(1)$

$\Rightarrow x^2 + y^2 + z^2 = r^2$

Hence, the correct option is (A).

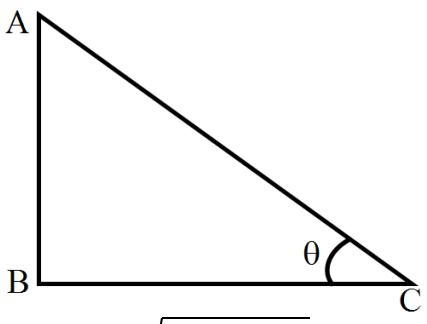
Q15. In right triangle ABC, right angled at C, if $\tan A = 1$, then the value of $2 \sin A \cos A$ is: **1 Mark**

A -1 **B** 1 **C** 2 **D** 0

Ans: B 1

Solution:

Let BC = k and AC = k



$\therefore AB = \sqrt{(k)^2 + (k)^2}$

$\sqrt{k^2 + k^2}$

$\Rightarrow AB = \sqrt{2k^2}$

$= \sqrt{2k}$

$\therefore 2\sin A\cos A = 2 \times \frac{k}{\sqrt{2k}} \times \frac{k}{\sqrt{2k}}$

$= 2 \times \frac{1}{2} = 1$

Q16. If $\cos A + \cos^2 A = 1$ then $\sin^2 A + \sin^4 A = ?$ **1 Mark**

A 1 **B** 2 **C** 4 **D** 3.

Ans: A 1

Solution:

$\cos A + \cos^2 A = 1$

$\Rightarrow \cos A = 1 - \cos^2 A$

$\Rightarrow \cos A = \sin^2 A$

Now, $\sin^2 A + \sin^4 A = \cos A + \cos^2 A = 1$

Q17. If $\sin\theta + \sin^2\theta = 1$ then $\cos^2\theta + \cos^4\theta$: **1 Mark**

A -1 **B** 1 **C** 0 **D** None of these.

Ans: B 1

Solution:

$\sin\theta + \sin^2\theta = 1$

$\Rightarrow \sin\theta = 1 - \sin^2\theta$

$\Rightarrow \sin\theta = \cos^2\theta$

$\cos^2\theta + \cos^4\theta = \sin\theta + \sin^2\theta$ { $\because \cos^2\theta = \sin\theta$}

$\Rightarrow \cos^2\theta + \cos^4\theta = 1$

{ $\because \sin\theta + \sin^2\theta = 1$(given)}

Q18. Choose the correct option and justify your choice: **1 Mark**

sin2A = 2sinA is true when A=

A 0° **B** 30° **C** 45° **D** 60°

Ans: A 0°

1. 0°

sin2A = 2sinA is true when A = 0°

Q19. $(1 + \tan\theta + \sec\theta)(1 + \cot\theta - \operatorname{cosec}\theta) =$ **1 Mark**

A 0 **B** 1 **C** 2 **D** -1

Ans: C 2

Solution:

$(1 + \tan\theta + \sec\theta)(1 + \cot\theta - \operatorname{cosec}\theta)$

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

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

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

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

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

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

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

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

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

Q20. If $\tan\theta = \frac{a}{b}$ then $\frac{\cos\theta + \sin\theta}{\cos\theta - \sin\theta} =$ **1 Mark**

A $\frac{a-a}{a+b}$ **B** $\frac{b-a}{b+a}$ **C** $\frac{b+a}{b-a}$ **D** None of these

Ans: C $\frac{b+a}{b-a}$

Solution:

Given: $\tan\theta = \frac{a}{b}$

Dividing all terms of $\frac{\cos\theta + \sin\theta}{\cos\theta - \sin\theta}$ by $\cos\theta$

$= \frac{1 + \tan\theta}{1 - \tan\theta} = \frac{1 + \frac{a}{b}}{1 - \frac{a}{b}} = \frac{b+a}{b-a}$

Q21. $\frac{\sin\theta}{1 - \cot\theta} + \frac{\cos\theta}{1 - \tan\theta}$ is equal to: **1 Mark**

A 0 **B** 1 **C** $\sin\theta + \cos\theta$ **D** $\sin\theta - \cos\theta$

Ans: C $\sin\theta + \cos\theta$

Solution:

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

$= \frac{\sin\theta \times \sin\theta}{\sin\theta - \cos\theta} + \frac{\cos\theta \times \cos\theta}{\cos\theta - \sin\theta}$

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

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

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

$= \sin\theta + \cos\theta$

Q22. If $x = a\cos\theta$ and $y = b\sin\theta$, then $b^2x^2 + a^2y^2 =$ **1 Mark**

A a^2b^2 **B** ab **C** a^4b^4 **D** $a^2 + b^2$

Ans: A a^2b^2

Solution:

$x = a\cos\theta$, $y = b\sin\theta$ . . . . . (i)

$bx = ab\cos\theta$, $ay = ab\sin\theta$ . . . . . (ii)

Adding (i) and (ii) we get,

$= b^2x^2 + a^2b^2\cos^2\theta + a^2b^2\sin^2\theta$

$= a^2b^2(\cos^2\theta + \sin^2\theta)$

$= a^2b^2 \times 1$

$= a^2b^2$

Q23. If $(\cos\theta + \sec\theta) = \frac{5}{2}$ then $(\cos^2\theta + \sec^2\theta) = ?$ **1 Mark**

A $\frac{21}{4}$ **B** $\frac{17}{4}$ **C** $\frac{29}{4}$ **D** $\frac{33}{4}$

Ans: B $\frac{17}{4}$

Solution:

$(\cos\theta + \sec\theta) = \frac{5}{2}$

$\Rightarrow (\cos\theta + \sec\theta)^2 = \left(\frac{5}{2}\right)^2$

$\Rightarrow \cos^2\theta + \sec^2\theta + 2\cos\theta\sec\theta = \frac{25}{4}$

$\Rightarrow \cos^2\theta + \sec^2\theta + 2\cos\theta \times \frac{1}{\cos\theta} = \frac{25}{4}$

$\Rightarrow \cos^2\theta + \sec^2\theta + 2 = \frac{25}{4}$

$\Rightarrow \cos^2\theta + \sec^2\theta = \frac{25}{4} - 2$

$\Rightarrow \cos^2\theta + \sec^2\theta = \frac{25-8}{4}$

$\Rightarrow \cos^2\theta + \sec^2\theta = \frac{17}{4}$

Q24. $2(\sin^6\theta + \cos^6\theta) - 3(\sin^4\theta + \cos^4\theta)$ is equal to: **1 Mark**

A 0 **B** 1 **C** -1 **D** None of these.

Ans: C -1

Solution:

$2(\sin^6\theta + \cos^6\theta) - 3(\sin^4\theta + \cos^4\theta)$

$= 2\left[(\sin^2\theta)^3 + (\cos^2\theta)^3\right] - 3\left[(\sin^2\theta)^2 + (\cos^2\theta)^2\right]$

$= 2\left[(\sin^2\theta + \cos^2\theta)(\sin^4\theta + \cos^4\theta - \sin^2\theta\cos^2\theta)\right]$

$= -3\left[(\sin^2\theta + \cos^2\theta)^2 - 2\sin^2\theta\cos^2\theta\right]$

$\{ \because a^3 + b^2 = (a + b)^3 - 3ab(a + b)\}$

$= 2\left[1(\sin^2\theta)^2 + (\cos^2\theta)^2 + 2\sin^2\theta\cos^2\theta - 3\sin^2\theta + \cos^2\theta\right]$

$= -3\left[(1)^2 - 2\sin^2\theta\cos^2\theta\right]$

$= 2\left[(\sin^2\theta + \cos^2\theta)^2 - 3\sin^2\theta\cos^2\theta\right] - 3\left[1 - 2\sin^2\theta\cos^2\theta\right]$

$= 2\left[1 - 3\sin^2\theta\cos^2\theta\right] - 3\left[1 - 2\sin^2\theta\cos^2\theta\right]$

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

$= -1$

Q25. If $2\cos3\theta = 1$ then $\theta = ?$ **1 Mark**

A 10° **B** 15° **C** 20° **D** 30°

Ans: C 20°

Solution:

$2\cos 3\theta = 1$

$\Rightarrow \cos 3\theta = \frac{1}{2}$

$\Rightarrow \cos 3\theta = \cos 60^\circ$

$\Rightarrow 3\theta = \cos 60^\circ$

$\Rightarrow \theta = 20^\circ$

Q26. Choose the correct option. Justify your choice: **1 Mark**

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

A $\sec^2 A$ **B** -1 **C** $\cot^2 A$ **D** $\tan^2 A$

Ans: D $\tan^2 A$

4. $\tan^2 A$

$$\frac{1+\tan^2 A}{1+\cot^2 A} = \frac{\sec^2 A - \tan^2 A + \tan^2 A}{\operatorname{cosec}^2 A - \cot^2 A + \cot^2 A}$$

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

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

Q27. If $\sec\theta + \tan\theta = x$, then $\sec\theta =$ **1 Mark**

A $\frac{x^2+1}{x}$ **B** $\frac{x^2+1}{2x}$ **C** $\frac{x^2-1}{2x}$ **D** $\frac{x^2-1}{x}$

Ans: B $\frac{x^2+1}{2x}$

Solution:

Given, $\sec\theta + \tan\theta = x$

We know that,

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

$\Rightarrow (\sec\theta + \tan\theta)(\sec\theta - \tan\theta) = 1$

$\Rightarrow x(\sec\theta - \tan\theta) = \frac{1}{x}$

Now,

$\sec\theta + \tan\theta = x,$

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

Adding the two equations, we get

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

$\Rightarrow \sec\theta + \tan\theta + \sec\theta - \tan\theta = \frac{x^2+1}{x}$

$\Rightarrow 2\sec\theta = \frac{x^2+1}{x}$

$\Rightarrow \sec\theta = \frac{x^2+1}{2x}$

Therefore, the correct choice is (b).

Q28. If $a\cos\theta + b\sin\theta = m$ and $a\sin\theta - b\cos\theta = n$, then $a^2 + b^2 =$ **1 Mark**

A $m^2 - n^2$ **B** m^2n^2 **C** $n^2 - m^2$ **D** $m^2 + n^2$

Ans: D $m^2 + n^2$

Solution:

$a\cos\theta + b\sin\theta = m$

$a\sin\theta - b\cos\theta = n$

Squaring and adding

$a^2\cos^2\theta + b^2\sin^2\theta + 2ab\ \sin\theta\cos\theta = m^2$

$a^2\sin^2\theta + b^2\cos^2\theta - 2ab\ \sin\theta\cos\theta = n^2$

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

$= m^2 + n^2\ \{\sin^2\theta + \cos^2\theta = 1\}$

$\Rightarrow a^2 + 1 + b^2 \times 1 = m^2 - n^2$

$\Rightarrow a^2 + b^2 = m^2 + n^2$

Hence, $a^2 + b^2 = m^2 + n^2$.

Q29. $(\sec A + \tan A)(1 - \sin A) = ?$ **1 Mark**

A $\sin A$ **B** $\cos A$ **C** $\sec A$ **D** $\operatorname{cosec} A$

Ans: B $\cos A$

Solution:

$(\sec A + \tan A)(1 - \sin A)$

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

$= \frac{(1+\sin A)}{\cos A} \times (1 - \sin A)$

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

$= \frac{\cos^2 A}{\cos A}$

$= \cos A$

Q30. $\cos^4 A - \sin^4 A$ is equal to: **1 Mark**

A $2\cos^2 A + 1$ **B** $2\cos^2 A - 1$ **C** $2\sin^2 A - 1$ **D** $2\sin^2 A + 1$

Ans: B $2\cos^2 A - 1$

Solution:

$\cos^4 A - \sin^4 A = (\cos^2 A + \sin^2 A)(\cos^2 A - \sin^2 A)$

$= 1(\cos^2 A - \sin^2 A) = \cos^2 A - (1 - \cos^2 A)$

$= \cos^2 A - 1 + \cos^2 A$

$= 2\cos^2 A - 1$

Q31. The value of $(\cos 60^\circ \cos 30^\circ - \sin 60^\circ \sin 30^\circ)$ is: **1 Mark**

A 0 **B** $\frac{\sqrt{3}}{2}$ **C** $\frac{1}{2}$ **D** 1

Ans: A 0

Solution:

Given that: $(\cos 60^\circ \cos 30^\circ - \sin 60^\circ \sin 30^\circ)$

$= \frac{1}{2} \times \frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2} \times \frac{1}{2}$

$= \frac{\sqrt{3}}{4} - \frac{\sqrt{3}}{4}$

$= 0$

ASSERTION AND REASON QUESTIONS

Q32. Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as: **1 Mark**

Assertion: In a right angled triangle, if $\cos\theta = \frac{1}{2}$ and $\sin\theta = \frac{\sqrt{3}}{2}$, then $\tan\theta = \sqrt{3}$.

Reason: $\tan\theta = \frac{\sin\theta}{\cos\theta}$.

A Both A and R are true and R is the correct explanation for A.

B Both A and R are true and R is not the correct explanation for A. **C** A is true but R is false.

D A is false but R is true.

Ans: A Both A and R are true and R is the correct explanation for A.

1. Both A and R are true and R is the correct explanation for A.

Q33. **Assertion:** In a right angled triangle, if $\tan\theta = \frac{3}{4}$, then greatest side of the triangle is 5 units. **1 Mark**

Reason: $(\text{greatest side})^2 = (\text{hypotenuse})^2 = (\text{perpendicular})^2 + (\text{base})^2$.

A A is true, R is true; R is a correct explanation for A. **B** A is true, R is true; R is not a correct explanation for A.

C A is true; R is false. **D** A is false; R is true.

Ans: A A is true, R is true; R is a correct explanation for A.

1. A is true, R is true; R is a correct explanation for A.

Q34. **Assertion:** If $\cos A + \cos^2 A = 1$ then $\sin^2 A + \sin^4 A = 2$. **1 Mark**

Reason: $\mathbf{1 - \sin^2 A = \cos^2 A,}$ for any value of A.

A Both A and R are true and R is the correct explanation for A.

B Both A and R are true and R is not the correct explanation for A. **C** A is true but R is false.

D A is false but R is true.

Ans: D A is false but R is true.

4. A is false but R is true.

Q35. Assertion: $\sin^2 67 + \cos^2 67 = 1$. **1 Mark**

Reason: For any value of θ, $\sin^2\theta + \cos^2\theta = 1$.

A Both A and R are true and R is the correct explanation for A.

B Both A and R are true and R is not the correct explanation for A.

C A is true but R is false.

D A is false but R is true.

Ans: A Both A and R are true and R is the correct explanation for A.

1. Both A and R are true and R is the correct explanation for A.