



## Trigonometry Sheet-4

Maths By Gagan Pratap

**Maths Special Batch**  
**By Gagan Pratap**

**1. Find the value of the following expression.**

निम्नलिखित व्यंजक का मान ज्ञात कीजिए।

$$5(\sin^4\theta + \cos^4\theta) + 3(\sin^6\theta + \cos^6\theta) + 19 \sin^2\theta \cos^2\theta$$

- (a) 8
- (b) 5
- (c) 6
- (d) 7

**2.  $3(\sin x - \cos x)^4 + 6(\sin x + \cos x)^2 + 4(\sin^6 x + \cos^6 x) = ?$  (CDS 2023)**

a) 11      b) 14      c) 13      d) 12  

$$3. \left( \frac{1}{\cos\theta} - \frac{1}{\sin\theta} \right) + \frac{1}{\operatorname{cosec}\theta - \cot\theta} - \frac{1}{\sec\theta + \tan\theta} = ?$$
  
 (a)  $\sec\theta \operatorname{cosec}\theta$  (b)  $\sin\theta \tan\theta$   
 (c)  $\operatorname{cosec}\theta \cot\theta$  (d)  $\sin\theta \cos\theta$

4.  $(\sec\theta + \tan\theta)^2 + \frac{1+\operatorname{cosec}\theta}{1-\operatorname{cosec}\theta}$ ,  $0^\circ < \theta < 90^\circ$  is:

$(\sec\theta + \tan\theta)^2 + \frac{1+\operatorname{cosec}\theta}{1-\operatorname{cosec}\theta}$ ,  $0^\circ < \theta < 90^\circ$  का मान ज्ञात करें।

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

5. If  $A + B + C = 90^\circ$ , then  $\sin \frac{A}{2} \cdot \sin \left( \frac{180^\circ - B - C}{2} \right) + \cos \frac{A}{2} \cdot \sin \frac{B+C}{2} = ?$   
 a)  $\frac{1}{2}$       b)  $\frac{1}{\sqrt{2}}$       c) 0      d)  $\frac{3}{\sqrt{2}}$

**6. The expression  $(\cos^6\theta + \sin^6\theta - 1)(\tan^2\theta + \cot^2\theta + 2) + 3$  is equal to :**

व्यंजक  $(\cos^6\theta + \sin^6\theta - 1)(\tan^2\theta + \cot^2\theta + 2) + 3$  का मान ज्ञात कीजिए।

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

**7.  $(\operatorname{cosec}A - \sin A)^2 + (\sec A - \cos A)^2 - (\cot A - \tan A)^2$  is equal to:**

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

**8. What is simplified value of  $1 + \tan A \cdot \tan \left( \frac{A}{2} \right)$ ?**

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

**9. Find the value of  $(\cot \frac{\alpha}{2} \cdot \tan \alpha - 1)(2 - \tan \alpha \cdot \sin 2\alpha) = ?$**

- a)  $2\sec \alpha$
- b)  $2\sin \alpha$
- c)  $2\cos \alpha$
- d)  $2\tan \alpha$



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10. The expression  $\sqrt{\sin^4 x + 4\cos^2 x} - \sqrt{\cos^4 x + 4\sin^2 x}$  is equal to:

$\sqrt{\sin^4 x + 4\cos^2 x} - \sqrt{\cos^4 x + 4\sin^2 x}$  का मान ज्ञात करें?

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

11.  $\frac{(2\sin A)(1+\sin A)}{1+\sin A+\cos A}$  is equal to:

$\frac{(2\sin A)(1+\sin A)}{1+\sin A+\cos A}$  बराबर है:

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

12.  $\frac{(\operatorname{cosec} \theta - \sec \theta)(\cot \theta - \tan \theta)}{(\operatorname{cosec} \theta + \sec \theta)(\sec \theta \cdot \operatorname{cosec} \theta - 2)} = ?$

- a) 2      b) 1      c) 3      d) -1

13.  $\cos^2 \theta + \cos^2 (\alpha + \theta) - 2\cos \alpha \cdot \cos \theta \cos (\theta + \alpha) = ?$

- a)  $\sin^2 \alpha$       b)  $\cos^2 \alpha$       c)  $\tan^2 \alpha$       d)  $\sec^2 \alpha$

14.  $\cos^2(A - B) + \cos^2 B - 2\cos(A - B) \cdot \cos A \cdot \cos B = ?$

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

15. Simplify  $\frac{1+\sin t}{4-4\sin t} - \frac{1-\sin t}{4+4\sin t}$ ?

$\frac{1+\sin t}{4-4\sin t} - \frac{1-\sin t}{4+4\sin t}$  को सरल कीजिए?

A)  $4\tan t \cdot \sin t$

B)  $\tan t \cdot \sec t$

C)  $\tan t - \sin t$

D)  $\tan t + \sin t$

16.  $\frac{\sin \theta \cdot \tan \theta}{1 - \cos \theta} + (\tan^2 \theta - \sec^2 \theta)$

- a)  $\sin \theta \cdot \cos \theta$       b)  $\sec \theta$   
c)  $\tan \theta$       d)  $\operatorname{cosec} \theta$

17.  $\frac{1 - \sin A \cos A}{\cos A (\sec A - \operatorname{cosec} A)} \cdot \frac{\sin^2 A - \cos^2 A}{\sin^3 A + \cos^3 A} = ?$

- a)  $\sin A$       b)  $\cos A$       c)  $\tan A$       d)  $\operatorname{cosec} A$

18. What is the value of

$$(1 + \cot A + \tan A)(\sin A - \cos A) \frac{\sin A \cos A}{\sin^3 A - \cos^3 A}$$

$(1 + \cot A + \tan A)(\sin A - \cos A) \frac{\sin A \cos A}{\sin^3 A - \cos^3 A}$  का मान क्या है-

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

19.  $1 - \frac{\sin^2 y}{1 + \cos y} + \frac{1 + \cos y}{\sin y} - \frac{\sin y}{1 - \cos y} = ?$

- a) 0      b) 1      c)  $\sin y$       d)  $\cos y$

20.  $\left( \frac{2\sqrt{2} + 3\sin A}{1 - 3\cos A} \right)^5 + \left( \frac{1 + 3\cos A}{2\sqrt{2} - 3\sin A} \right)^5 = ?$

- a)  $(2\sqrt{2})^5$       b) 243      c) 0      d) 1

21. The value of  $\frac{\sin A}{\cot A + \operatorname{cosec} A} - \frac{\sin A}{\cot A - \operatorname{cosec} A} - 1$  is:

$\frac{\sin A}{\cot A + \operatorname{cosec} A} - \frac{\sin A}{\cot A - \operatorname{cosec} A} - 1$  का मान ज्ञात करें।

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

22.  $\frac{\sin x - \cos x + 1}{\sin x + \cos x - 1}$  is equal to?



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

23. If  $\tan^2 \alpha \tan^2 \beta + \tan^2 \beta \tan^2 \gamma + \tan^2 \gamma \tan^2 \alpha + 2 \tan^2 \alpha \tan^2 \beta \tan^2 \gamma = 1$ , then  $\sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma = ?$

- a) 0      b) 1      c) -1      d) 3

24.  $\frac{\tan A}{1-\cot A} + \frac{\cot A}{1-\tan A} - \frac{2}{\sin 2A} = ?$

- a) -1      b) 1      c) 0      d) 2

25.  $\sec \theta \left( \frac{1+\sin \theta}{\cos \theta} + \frac{\cos \theta}{1+\sin \theta} \right) - 2 \tan^2 \theta$  is equal to?

- a) 4      b) 1      c) 2      d) 0

26.  $[(\sec x \sec y + \tan x \tan y)^2 - (\sec x \sec y + \tan x \tan y)^2] = ?$

- a) -1      b) 0      c)  $\sec^2 x$       d) 1

27. Let  $a = \frac{2 \sin x}{1 + \sin x + \cos x}$  and  $b = \frac{c}{1 + \sin x}$ , If  $a = b$ , then  $c = ?$

माना  $a = \frac{2 \sin x}{1 + \sin x + \cos x}$  और  $b = \frac{c}{1 + \sin x}$  यदि  $a = b$  है, तो  $c = ?$

- (a)  $1 - \sin x \cos x$  (b)  $1 + \sin x - \cos x$

- (c)  $1 + \sin x \cos x$  (d)  $1 + \cos x - \sin x$

28. If  $x = \frac{2 \sin \theta}{(1 + \cos \theta + \sin \theta)}$ , then the value of  $\frac{1 - \cos \theta + \sin \theta}{(1 + \sin \theta)}$  is:

यदि  $x = \frac{2 \sin \theta}{(1 + \cos \theta + \sin \theta)}$  है, तो  $\frac{1 - \cos \theta + \sin \theta}{(1 + \sin \theta)}$  का मान है— (CPO 2022)

- (a)  $\frac{x}{(1+x)}$       (b) x      (c)  $1/x$       (d)  $(1+x)$

29. If  $\operatorname{cosec} \theta - \sin \theta = p^3$  and  $\sec \theta - \cos \theta = q^3$ , then what is the value of  $\tan \theta$ ?

यदि  $\operatorname{cosec} \theta - \sin \theta = p^3$  और  $\sec \theta - \cos \theta = q^3$  हैं तो  $\tan \theta$  का मान क्या है?

- (a)  $\frac{p}{q}$       (b)  $\frac{q}{p}$   
(c) pq      (d) p + q

30.  $\frac{\tan A}{1 - \cot A} + \frac{\cot A}{1 - \tan A} = K + \tan A + \cot A$ , then K = ?

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

31. If  $(\sin \theta + \operatorname{cosec} \theta)^2 + (\cos \theta + \sec \theta)^2 = k + \tan^2 \theta + \cot^2 \theta$ , then the value of k is equal to:

यदि  $(\sin \theta + \operatorname{cosec} \theta)^2 + (\cos \theta + \sec \theta)^2 = k + \tan^2 \theta + \cot^2 \theta$  है, तो k का मान ज्ञात कीजिए।

- (a) 7      (b) 2      (c) 9      (d) 5

32. If  $2 \frac{\cos^2 x - \sec^2 x}{\tan^2 x} = a + b \cos 2x$ , then find a, b?

यदि  $\frac{2 \cos^2 x - \sec^2 x}{\tan^2 x} = a + b \cos 2x$  है, तो a, b ज्ञात कीजिये?

A)  $-3/2, -1/2$

B)  $3/2, 1/2$

C)  $-3, -1$

D)  $3, 1$

33. If A, B and C are angles of a triangle, then  $\sin^2 A + \sin^2 B + \sin^2 C - 2 \cos A \cos B \cos C = ?$

- a) 0      b) 1      c) 2      d) 4

34.  $\tan^2 \alpha = 1 + 2 \tan^2 \beta$  then find the value of  $\sqrt{2} \cos \alpha - \cos \beta = ?$

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

35. If  $\tan \theta - \cot \theta = a$  and  $\cos \theta + \sin \theta = b$ , then  $(b^2 - 1)^2 (a^2 + 4) = ?$

- a) 2      b) 1      c) 0      d) 4



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36. If  $\operatorname{Cosec}\theta - \sin\theta = 1$  &  $\sec\theta - \cos\theta = m$ , then  $l^2m^2(l^2+m^2+3) = ?$

- a) 0      b) 1      c) -1      d) 2

37. If  $\cos\theta + \sin\theta = m$ ,  $\sec\theta + \operatorname{cosec}\theta = n$ , then  $n(m^2-1)$  is equal to?

- a) **2m**      b) mn      c) 4mn      d) 2n

38.  $a(\tan\theta + \cot\theta) = 1$ ,  $\sin\theta + \cos\theta = b$  and  $0 < \theta < 90^\circ$ , then relation between a and b?

- a)  $b^2=2(a+1)$       b)  $b^2=2(a+1)$       c)  **$2a=b^2-1$**       d)  $2a=b^2+1$

39. If  $x\sin^3\theta + y\cos^3\theta = \sin\theta\cos\theta$  &  $x\sin\theta - y\cos\theta = 0$  for every  $\theta \in (0, \frac{\pi}{2})$ , then what is  $x^2 + y^2$  equal to?

यदि  $x\sin^3\theta + y\cos^3\theta = \sin\theta\cos\theta$  &  $x\sin\theta - y\cos\theta = 0$  प्रत्येक  $\theta \in (0, \frac{\pi}{2})$  के लिए, तो  $x^2 + y^2$  किसके बराबर है? (CDS 2023)

- A) 0  
B) 1  
C) 2  
D) 3

40. If  $2y\cos\theta = x \sin\theta$  and  $2x\sec\theta - y\operatorname{cosec}\theta = 3$ , then  $x^2+4y^2=?$

- a) 1      b) 2      c) 0      d) **4**

41. If  $\cos^2\theta - \sin^2\theta = \tan^2\varphi$ , then which of the following is true?

यदि  $\cos^2\theta - \sin^2\theta = \tan^2\varphi$  है, तो निम्नलिखित में से कौन सा विकल्प सही है?

- (a)  $\cos\theta \cos\varphi = 1$       (b)  $\cos^2\varphi - \sin^2\varphi = \tan^2\theta$   
(c)  $\cos^2\varphi - \sin^2\varphi = \cot^2\theta$       (d)  $\cos\theta \cos\varphi = \sqrt{2}$

42. If  $\tan A + \sin A = p$  and  $\tan A - \sin A = q$ , then which of the following is true?

- a)  $p^2+q^2=4\sqrt{pq}$       b)  $p+q=pq$       c)  $p-q=pq$       d)  **$p^2 - q^2 = 4\sqrt{pq}$**

43. If  $a = \cot A + \cos A$  &  $b = \cot A - \cos A$ , then find the value of

$a^2 - b^2 - 4\sqrt{ab}$ ?

यदि  $a = \cot A + \cos A$  और  $b = \cot A - \cos A$ , तो  $a^2 - b^2 - 4\sqrt{ab}$  का मान जात कीजिए?

- A) 0  
B) -1  
C) 1  
D) -4