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STUDY PLANET

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TRIGONOMETRY

CLASS TENTH BOOKLET

Er. CHANDAN KAPOOR

"If you want to be successful, you must respect one rule : Never lie to yourself."
-Poulo Coelho

-: Objective type questions :-

Q1. The value of $\cos^2 19^o - \sin^2 71^o$ is -

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

Q2. If $\tan\theta = \frac{12}{5}$, than the value of $\frac{1-\sin\theta}{1+\sin\theta}$ is -

(a) $\frac{1}{5}$ (b) 0 (c) $\frac{1}{25}$ (d) $\frac{-1}{25}$

Q3. The value of $\frac{\sin 9^o}{\cos 81^o} - \frac{\cos 81^o}{\sin 9^o}$ is -

(a) 0 (b) 1 (c) 2 (d) None of these

Q4. Which of the following is equal to $\sin 67^0 + \cos 75^o$?

(a) $\cos 23^o - \sin 15^o$ (b) $\cos 23^o + \sin 15^o$

(c) $\cos^2 23^o + \sin^2 15^o$ (d) $\cos 67^0 + sin 75^o$

Q5. The value of $\frac{5}{\cot^2\theta} - \frac{5}{\cos^2\theta}$ is

(a) 0 (b) 1 (c) 5 (d) -5

Q6. For what value of $\sin\theta = \cos\theta$?

(a) 0^o (b) 30^o (c) 45^o (d) 90^o

Q7. If $\sin 3A = \cos(A - 26^o)$, where 3A is an acute angle, then the value of A is :

(a) 39^o (b) 29^o (c) 49^o (d) 45^o

Q8. If $2\sin\frac{x}{2} = 1$, then the value of x is -

(a) 90^o (b) 30^o (c) 45^o (d) 60^o

Q9. The vlaue of $\tan 5^o \tan 25^o \tan 30^o \tan 65^o \tan 85^o$ is -

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

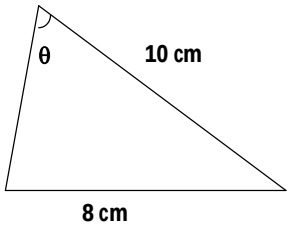
Q10. If $\tan 2\theta = \cot(\theta + 9^o)$ where 2θ and $\theta + 9^o$ are acute angles, then the value of θ is

(a) $\theta = 27^o$ (b) $\theta = 25^o$ (c) $\theta = 37^o$ (d) $\theta = 35^o$

Q11. In a ΔABC, if $\angle \mathbf{B} = 90^o$ and $\sin A = \frac{3}{4}$, then the value of tan A is -

(a) $\frac{\sqrt{7}}{3}$ (b) $\frac{3}{\sqrt{7}}$ (c) $\frac{\sqrt{3}}{7}$ (d) $\frac{7}{\sqrt{3}}$

Q12. From the given figure, the value of $25(\sin^2\theta + 2\cos^2\theta - \tan\theta)$ is-



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

Q13. $\dfrac{\tan^2 60^o + 4\cos^2 45^o + 3\sec^2 30^o + 5\cos^2 90^o}{\cos ec30^o + \sec 60^o - \cot^2 30^o}$ is

(a) 9 (b) $\frac{1}{9}$ (c) 3 (d) $\frac{1}{3}$

Q14. The value of $\left(\dfrac{\sin 29^o}{\cos 61^o}\right) + \left(\dfrac{\cos 27^o}{\sin 63^o}\right) - 4\cos^2 45^o$ is -

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

Q15. If $x = \cot A + \cos A$ and $y = \cot A - \cos A$, then the value of $\left(\dfrac{x-y}{x+y}\right)^2 + \left(\dfrac{x-y}{2}\right)^2$

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

Q16. In $\Delta ABC, \angle \mathbf{B} = 90^o, BC = 5$ and $AC - AB = 1\,cm$, the value of $\dfrac{1+\sin C}{\cos C}$ is-

(a) 5 (b) $\frac{1}{5}$ (c) 2 (d) $\frac{1}{2}$

Q17. If $\cos\alpha = \frac{1}{2}$ and $\tan\beta = \dfrac{1}{\sqrt{3}}$, then the value of $\sin(\alpha+\beta)$, where α and β both are acute angles, is -

(a) $\frac{1}{2} + \frac{1}{\sqrt{3}}$ (b) $\sqrt{3}+2$ (c) 1 (d) 0

A. Fill In the Blanks :

1. The value of $\sec^2 x - \cot^2(90^o - x)$ is --------
2. The value of $\sin 18^o - \cos 72^o$ is----------
3. The value of $\sin\theta$ lies between ----------$\le \sin\theta \le$ ----------
4. The value of $\sec^2 x(1+\sin x)(1-\sin x)$ is ----------
5. The value of $\sin^2 25^o + \sin^2 65^o$ is ----------
6. If $\cos\theta + \cos^2\theta = 1$, then the value of $\sin^2\theta + \sin^4\theta$ is ----------
7. If $x = a\sec\theta\cos\phi,\ y = b\sec\theta\sin\phi$, then the value of $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2}$ is ----------
8. If $\sec x + \tan x = k$, then value of $\sin x$ ----------
9. If $\sin(x + 36^o) = \cos x$, then value of x ----------
10. In triangle ABC, if $A + B = 90^o$, then value of cos C is----------

B. True and False :

1. If θ is acute angle, then $\sin^2\theta\cos^2\theta = 1$.
2. The value of $\cos\theta$ is lies between $-1 to 1$.
3. Is $\tan 30^o = \sqrt{3}$?
4. The value of $\sin 1^o \sin 3^o ----- \sin 180^o = 0$
5. Trigonometry is branch of mathematics in which we deal with the relationship between angle and sides of a triangle.
6. Is $\sec^2\theta - \tan^2\theta = 1$?
7. Is $\text{cosec}^2\theta + \cot^2\theta = 1$?
8. Is $\frac{\sin\theta}{\cos\theta} = \tan\theta$?
9. Is $\sin 90^o = 1$?

C. Assertion-Reason Type Questions :

Consider the following statements :

(a) Both the statements 1 and 2 are true and statement 2 is the correct explanation for statement 1.
(b) Both the statements 1 and 2 are true and statement 2 is not the correct explanation for statement 1.
(c) Statement 1 is true but statement 2 is false.
(d) Statement 1 is false but statement 2 is true.

Choose the correct option from (a), (b), (c) and (d) in the following-

1. Statement 1: $\tan 1^o + \tan 2^o \tan 3^o \ldots\ldots \tan 89^o = 1$

   Statement 2 : $\tan\theta^o \tan\left(90^o - \theta^o\right) = 1.$

2. Statement 1: $\sin^2 10^o + \sin^2 20^o + \sin^2 30^o + \ldots\ldots + \sin^2 90^o = 0$

   Statement 2 : $\sin^2\theta^o + \cos^2\theta = 1$

3. Statement 1: If $\sec\theta^o + \tan\theta = a$, then $\sec\theta = \frac{a^2+1}{2a}$

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

4. Statement 1: $\cos 80^o - \sin 80^o$ is negative.

   Statement 2 : $\cos^2 25^o - \sin^2 65^o$ is positive.

5. Statement 1: $\left(\cot\theta + 3\right)\left(3\cot\theta + 1\right) = 3\,\text{cosec}^2\theta + \cot\theta$

   Statement 2 : $1 + \cot^2\theta = \text{cosec}^2\theta.$

6. Statement 1: $2\sec\theta = a + \frac{1}{a}$, where $a > 0, a \neq 1$.

   Statement 2 : $-1 \le \cos\theta \le 1$ for al values of θ.

Very Short Answer Question.

Q1. Express $\sin\theta$ in terms of $\sec\theta$.

Q2. Evaluate : $\left(\sec^2\theta - 1\right)\left(1 - \text{cosec}^2\theta\right)$

Q3. Express $\sin\theta\,(co\sec\theta-\cot\theta)$ in terms of $\cos\theta$.

Q4. What is the value of $\left(\frac{1-\tan\theta}{1-\cot\theta}\right)^2$ in terms of $\tan\theta$.

Q5. If $a=\frac{\sin\theta}{1+\cos\theta}$ and $b=\frac{1-\cos\theta}{\sin\theta}$, then what is the relation between a and b ?

Q6. If $a=\tan^2\theta-\sin^2\theta$ and $b=\tan^2\theta\sin^2\theta,$ then that is the value of a-b.

Q7. If $x=\sin^2\theta-\cos^2\alpha,\ y=\sin^2\alpha-\cos^2\theta,$ then what is the relation between x and y.

Q8. Evaluate $(1-\sin\theta)(1+\sin\theta)(1+\tan^2\theta)$.

Q9. If $a=1-2\sin^2\theta+\sin^4\theta$ and $b=\cos^4\theta$, then what is the value of a-b.

Q10. What is the value of $\sin^4\theta-\cos^4\theta$ in terms of $\sin\theta$.

Q11. If $\cos\theta=\frac{7}{8}$, evaluate $\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$

Q1. Prove the following identities :

(a) $\sec^2\theta+\cos ec^2\theta=\sec^2.\cos ec^2\theta$.

(b) $\frac{\cos^2\theta}{\sin\theta}+\sin\theta=\cos ec\theta$

(c) $\cot\theta+\tan\theta=\cos ec\theta.\sec\theta$

Q2. $\frac{1-\sin\theta}{1+\sin\theta}=\left(\frac{1-\sin\theta}{\cos\theta}\right)^2$

Q3. $\frac{1-\cos\theta}{1+\cos\theta}=\left(\frac{1-\cos\theta}{\sin\theta}\right)^2$

Q4. $\left(\frac{1+\cos\theta}{\sin\theta}\right)^2=\frac{1+\cos\theta}{1-\cos\theta}$

Q5. $\frac{\cos\theta}{1+\sin\theta}=\frac{1-\sin\theta}{\cos\theta}$

Q6. $\left(\sin^8\theta-\cos^8\theta\right)=\left(\sin^2\theta-\cos^2\theta\right)\left(1-2\sin^2\theta.\cos^2\theta\right)$

Q7. $2\left(\sin^6\theta+\cos^6\theta\right)-3\left(\sin^4\theta+\cos^4\theta\right)+1=0$

Q8. $\frac{\cos A}{1-\tan A}+\frac{\sin A}{1-\cot A}=\sin A+\cos A$

Q9. $\frac{\sin\theta}{1+\cos\theta}+\frac{1+\cos\theta}{\sin\theta}=\frac{2}{\sin\theta}$

Q10. $\frac{1}{1+\sin\theta}+\frac{1}{1-\sin\theta}=2\sec^2\theta$

Q11. $\frac{1+\sin\theta}{\cos\theta}+\frac{\cos\theta}{1+\sin\theta}=2\sec\theta$

Q12. $\frac{\cos\theta}{1-\sin\theta}+\frac{\cos\theta}{1+\sin\theta}=\frac{2}{\cos\theta}$

Q13. $\frac{1}{1+\cos\theta}+\frac{1}{1-\cos\theta}=\frac{2}{\sin^2\theta}$

Q14. $\frac{1}{1-\sin\theta}-\frac{1}{1+\sin\theta}=\frac{2\tan\theta}{\cos\theta}$

Q15. $\cot^2\theta-\cos^2\theta=\cot^2\theta.\cos^2\theta$

Q16. $\tan^2\phi-\sin^2\phi-\tan^2\phi.\sin^2\phi=0$

Q17. $\tan^2\phi+\cot^2\phi+2=se\,c^2\phi.\cos ec^2\phi$

Q18. $\frac{\tan\theta}{1-\cot\theta}+\frac{\cot\theta}{1-\tan\theta}=1+\tan\theta+\cot\theta$

Q19. $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}}=\frac{\cos\theta}{1+\sin\theta}$

Q20. $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}}+\sqrt{\frac{1-\sin\theta}{1+\sin\theta}}=2\sec\theta$

Q21. If $sec\theta+\tan\theta=m$ and $\sec\theta-\tan\theta=n$, then proved that $\sqrt{mn}=1$

Q22. If $\cos\theta+\sin\theta=1$, then prove that $\cos\theta-\sin\theta=\pm1$

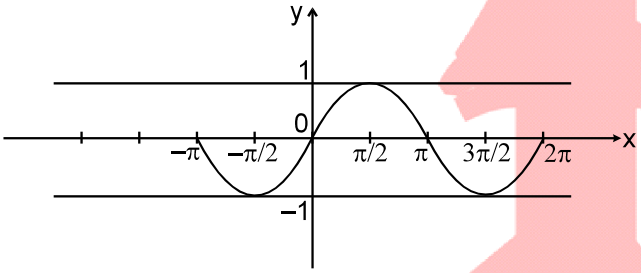
Q23. If $\tan\theta+\sec\theta=x$, show that $\sin\theta=\frac{x^2-1}{x^2+1}$

Q24. If $\sin\theta+\cos\theta=p$ and $\sec\theta+\text{cosec}\theta=q$, then show that $q\left(p^2-1\right)=2p$

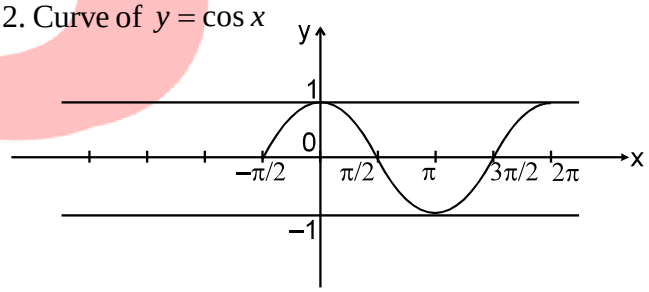
Q25. If $a\cos\theta+b\sin\theta=c$, then prove that $a\sin\theta-b\cos\theta=\pm\sqrt{a^2+b^2-c^2}$

Q26. If $\left(a^2-b^2\right)\sin\theta+2ab\cos\theta=a^2+b^2$, then prove that $\tan\theta=\frac{a^2-b^2}{2ab}$

1. Curve of $y=\sin x$



2. Curve of $y=\cos x$



"thru oky dHkh NkMr ugh vkj NkMu oky dHkh thrr ugh A"

"Learn from the past, prepare for the future and perform in the moment."

Answer key

Objective type

1(B) 2(C) 3(A) 4(B) 5(D) 6(B) 7(B) 8(D) 9(A) 10(A) 11(B) 12(A) 13(A) 14(A) 15(B) 16(A) 17(C)

A. Fill in the blanks

1. one 2. Zero 3. $-1\le\sin\theta\le1$ 4. one 5. one 6. one

7. $\sec^2\theta$ 8. $\frac{k^2-1}{k^2+1}$ 9. 27^0 10. Zero

B. True and False:

1. T 2. T 3. F 4. T 5. T 6. T 7. F 8. T 9. T

C. Assertion-Reason Type Questions :

1. a 2. d 3. b 4. c 5. a 6. d