MATHS

BOOKS - PATHFINDER MATHS (BENGALI ENGLISH)

TRIGONOMETRIC RATIOS OF COMPOUND ANGLES

Questionbank

1. Find the value of $\sin 15°$

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2. Prove that $\cos^2 45° - \sin^2 15° = \dfrac{\sqrt{3}}{4}$

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3. Evaluate: $\cos 80° \cos 20° + \sin 80° \sin 20°$

4. Prove that $\dfrac{\sin(A + B) + \sin(A - B)}{\cos(A + B) + \cos(A - B)} = \tan A$

5. Prove that $\tan 54° = \dfrac{\cos 9° + \sin 9°}{\cos 9° - \sin 9°}$

6. Evaluate: $\sin\dfrac{\pi}{4}\cos\dfrac{\pi}{12} + \cos\dfrac{\pi}{4}\sin\dfrac{\pi}{12}$

7. $\dfrac{\tan\left(\frac{\pi}{4} + x\right)}{\tan\left(\frac{\pi}{4} - x\right)} = \left(\dfrac{1 + \tan x}{1 - \tan x}\right)^2$

8. Prove that $\sin^2\left(\dfrac{\pi}{8} + \dfrac{A}{2}\right) - \sin^2\left(\dfrac{\pi}{8} - \dfrac{A}{2}\right) = \dfrac{1}{\sqrt{2}}\sin A$

9. Find the value of $\tan 15°$

10. Prove that $\sin^2(n + 1)A - \sin^2 nA = \sin(2n + 1)A \sin A$

11. If tan(A+B)=x and tan(A-B)=y find the value of tan2A.

12. If $\log_b n = 2$ and $og_n 2b = 2$, then find the value of b.

13. Prove that $\dfrac{\tan 69^\circ + \tan 66^\circ}{1 - \tan 69^\circ \tan 66^\circ} = -1.$

14. If $\tan A = \dfrac{5}{6}$ and $\tan B = \dfrac{1}{11}$, Prove that $A + B = \dfrac{\pi}{.4}$

15. Prove that

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

16. Prove that

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

17. Prove that $\tan 8\theta - \tan 6\theta - \tan 2\theta = \tan 8\theta \tan 6\theta \tan 2\theta$.

18. If tanA+tanB=a and cotA+cotB=b.Prove that $\cot(A + B) = \dfrac{1}{a} - \dfrac{1}{b}$

19. If $\tan x + \tan\left(x + \dfrac{\pi}{3}\right) + \tan\left(x + \dfrac{2\pi}{3}\right) = 3$ then prove that $\dfrac{3\tan x - \tan^3 x}{1 - 3\tan^2 x} = 1$

20. $\cos(\beta - \gamma) + \cos(\gamma - \alpha) + \cos(\alpha - \beta) = -\dfrac{3}{2}$ show that $\cos\alpha + \cos\beta + \cos\gamma = 0$ and $\sin\alpha + \sin\beta + \sin\gamma = 0$ also $\cos(\beta - \gamma) = \cos(\gamma - \alpha) = \cos(\alpha - \beta) = -\dfrac{1}{2}$.

21. If $\tan(\pi\cos\theta) = \cot(\pi\sin\theta)$ Prove that $\sin\left(\theta + \dfrac{\pi}{4}\right) = \dfrac{1}{2\sqrt{2}}$

22. Let $\tan\alpha = \dfrac{a}{a+1}$ and $\tan\beta = \dfrac{1}{2a+1}$, then $\alpha + \beta$ is:

23. If θ lies in the 1st quadrant and $\cos\theta = \dfrac{8}{17}$ then prove that

$$\cos\left(\frac{\pi}{6} + \theta\right) + \cos\left(\frac{\pi}{4} - \theta\right) + \cos\left(\frac{2\pi}{3} - \theta\right) = \left(\frac{\sqrt{3} - 1}{2} + \frac{1}{\sqrt{2}}\right) \cdot \frac{23}{17}$$

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24. If α, β are the solutions of the equation
$a\tan\theta + b\sec\theta = c$ then show that $\tan(\alpha + \beta) = \dfrac{2ac}{a^2 - c^2}$.

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25. Prove that $\tan 70^\circ = 2\tan 50^\circ + \tan 20^\circ$.

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