Inverse Trigonometry Practice Questions

Lead the Class

I. Solve

1. Find $\cos^{-1}(1/2 \tan 3\pi/4)$
2. Show that $\tan^{-1} x = \cot^{-1} \frac{1}{x}$
3. Show that $\sec^{-1} x + \text{cosec}^{-1} x = \frac{\pi}{2}$
4. Show that $\cot^{-1}(-x) = \pi - \cot^{-1} x$
5. Find $\cos\left[\cot^{-1}\left(\frac{-7}{24}\right)\right]$

B.

1. Show that $2\tan^{-1}\frac{1}{8} + \tan^{-1}\frac{1}{7} + 2\tan^{-1}\frac{1}{5} = \frac{\pi}{4}$
2. Simplify $\tan^{-1}\left(\sqrt{\frac{1+\cos x}{1-cosx}}\right)$
3. If $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \frac{\pi}{2}$ prove that
   $x^2 + y^2 + z^2 + 2xyz = 1$
4. Find $\cos\left(\cos^{-1} x - \cos^{-1} 3y\right)$
5. Solve $\sin^{-1} x + \sin^{-1} 2x = \frac{2\pi}{3}$
6. Show that $\tan^{-1}\left(\frac{\sqrt{1+x} - \sqrt{1-x}}{\sqrt{1+x} + \sqrt{1-x}}\right) = \frac{\pi}{4} - \frac{1}{2}\cos^{-1} x$
   $if - 1/2 \le x \le 1$
7. If $\cos^{-1}\frac{p}{a} + \cos^{-1}\frac{q}{b} = \alpha$ prove that
   $\frac{p^2}{a^2} - \frac{2pq}{ab}\cos\alpha + \frac{q^2}{b^2} = \sin^2\alpha$
8. If $\theta = \cot^{-1}\sqrt{\cos x} - \tan^{-1}\sqrt{\cos x}$ then prove that
   $\sin\theta = \tan^2\frac{x}{2}$

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