**Question 1**: Find the exact values

| | | | |
|---|---|---|---|
| a) $\arcsin 1 =$ | b) $\arcsin 0 =$ | c) $\arcsin(-1) =$ | d) $\arcsin\left(\frac{\sqrt{3}}{2}\right) =$ |
| e) $\arcsin\left(\frac{-\sqrt{3}}{2}\right)$ | f) $\arccos 1 =$ | g) $\arccos\left(\frac{1}{2}\right) =$ | h) $\arctan 1 =$ |
| i) $\arctan\sqrt{3} =$ | j) $\arctan\left(\frac{1}{\sqrt{3}}\right) =$ | k) $\cos^{-1}\left(\cos\left(-\frac{\pi}{3}\right)\right) =$ | l) $\tan^{-1}\left(\tan\frac{7\pi}{6}\right) =$ |

**Question 2**: Evaluate

| | |
|---|---|
| a) $\cos\left(\sin^{-1}\left(\frac{1}{2}\right)\right) =$ | b) $\cos\left(\arctan\left(-\sqrt{3}\right)\right) =$ |
| c) $\sin\left(2\tan^{-1}\left(\frac{1}{\sqrt{3}}\right)\right) =$ | d) $\cos\left(2\cos^{-1}\left(\frac{5}{13}\right)\right) =$<br>(tip: use double angle formula for cosine, i.e. $\cos 2\theta = 2\cos^2\theta - 1$ ) |

| | |
|---|---|
| e) $sec\left[sin^{-1}\left(-\frac{1}{3}\right)\right] =$<br>(tip: you will need to use $sin^2x + cos^2x = 1$ ) | f) $cosec\left[cos^{-1}\left(\frac{2}{3}\right)\right] =$<br>(tip: you will need to use $sin^2x + cos^2x = 1$ ) |

**Question 3**: Find the exact values of:

| | |
|---|---|
| a) $sin\left[sin^{-1}\left(\frac{3}{5}\right)\right] + sin\left[sin^{-1}\left(-\frac{3}{5}\right)\right]$ | b) $cos\left[2\,cos^{-1}\left(\frac{1}{3}\right)\right]$ |

**Question 4:** Show that $f(x) = tan\,(cos^{-1}x)$ is an odd function

**Question 5**: Show that:

a) $tan^{-1}(4) - tan^{-1}\left(\frac{3}{5}\right) = \frac{\pi}{4}$

b) $cos^{-1}\left(\frac{3}{5}\right) - tan^{-1}\left(-\frac{3}{4}\right) = \frac{\pi}{2}$

c) $sin^{-1}\left(\frac{5}{13}\right) + tan^{-1}\left(\frac{16}{63}\right) = cos^{-1}\left(\frac{4}{5}\right)$

**Question 6**: Find the exact values of:

| | |
|---|---|
| c) $\cos\left[\sin^{-1}\left(\frac{5}{13}\right)+\sin^{-1}\left(\frac{4}{5}\right)\right]$<br>(tip: use the formula<br>$\cos(\alpha+\beta)=\cos\alpha\cos\beta-\sin\alpha\sin\beta$ and also<br>$\sin^2x+\cos^2x=1$ ) | d) $\sin\left[2\tan^{-1}\left(\frac{4}{3}\right)\right]$<br>(tip: use double angle formula for sine, i.e.<br>$\sin 2\theta=2\sin\theta\cos\theta$ |

**Question 6:** If $f(x)=3\cos^{-1}\left(\frac{x}{2}\right)$, determine the inverse function $f^{-1}$ and specify its domain and range.

**Question 7:** Solve simultaneously the two equations $2\ sin^{-1}x + cos^{-1}y = -\frac{\pi}{12}$ and $sin^{-1}x - 2\ cos^{-1}y = -\frac{2\pi}{3}$

**Question 8:**

a) Let $\theta = sin^{-1}x$. Use the fact that $cos\left(\frac{\pi}{2} - \theta\right) = sin\,\theta$ to show that $cos^{-1}x = \frac{\pi}{2} - \theta$

b) deduce that $sin^{-1}x + cos^{-1}x = \frac{\pi}{2}$