1.

$$\sin^{-1}(-x) = -\sin^{-1}(x).$$

$\sin^{-1}(x)$ is the inverse of sin(x), it is odd function.

2.

$$\sec^{-1}(-x) = \pi - \sec^{-1}(x).$$

$\text{cosec}^{-1}(x)$ is odd function ($\text{cosec}^{-1}(x) = \sin^{-1}\left(\frac{1}{x}\right)$).

And

$$\sec^{-1}(-x) + \text{cosec}^{-1}(-x) = \frac{\pi}{2} \rightarrow \sec^{-1}(-x) = \frac{\pi}{2} - \text{cosec}^{-1}(-x) = \frac{\pi}{2} + \text{cosec}^{-1}(x).$$

But

$$\text{cosec}^{-1}(x) = \frac{\pi}{2} - \sec^{-1}(x).$$

Thus

$$\sec^{-1}(-x) = \frac{\pi}{2} + \frac{\pi}{2} - \sec^{-1}(x) = \pi - \sec^{-1}(x).$$

3.

$$\tan^{-1}(-x) = -\tan^{-1}(x).$$

$\tan^{-1}(x)$ is odd function.

4.

$$\cot^{-1}(-x) = \pi - \cot^{-1}(x).$$

$$\cot^{-1}(-x) + \tan^{-1}(-x) = \frac{\pi}{2} \rightarrow \cot^{-1}(-x) = \frac{\pi}{2} - \tan^{-1}(-x) = \frac{\pi}{2} + \tan^{-1}(x).$$

But

$$\tan^{-1}(x) = \frac{\pi}{2} - \cot^{-1}(x).$$

Thus

$$\cot^{-1}(-x) = \frac{\pi}{2} + \frac{\pi}{2} - \cot^{-1}(x) = \pi - \cot^{-1}(x).$$

5.

$$\text{cosec}^{-1}(-x) = -\text{cosec}^{-1}(x).$$

$\text{cosec}^{-1}(x)$ is odd function ($\text{cosec}^{-1}(x) = \sin^{-1}\left(\frac{1}{x}\right)$).