



Trigonometric Ratios Ex 5.3 Q3

**Answer :**

(i) We have  $\sin(90^\circ - \theta) = \cos \theta$  and  $\cos(90^\circ - \theta) = \sin \theta$ . So

$$\begin{aligned}\sin 59^\circ + \cos 56^\circ &= \sin(90^\circ - 31^\circ) + \cos 90^\circ(90^\circ - 34^\circ) \\ &= \cos 31^\circ + \sin 34^\circ\end{aligned}$$

Thus the desired expression is  $\boxed{\cos 31^\circ + \sin 34^\circ}$

(ii) We know  $\tan(90^\circ - \theta) = \cot \theta$  and  $\cot(90^\circ - \theta) = \tan \theta$ . So

$$\begin{aligned}\tan 65^\circ + \cot 49^\circ &= \tan(90^\circ - 25^\circ) + \cot 90^\circ(90^\circ - 41^\circ) \\ &= \cot 25^\circ + \tan 41^\circ\end{aligned}$$

Thus the desired expression is  $\boxed{\cot 25^\circ + \tan 41^\circ}$

(iii) We know that  $\sec(90^\circ - \theta) = \operatorname{cosec} \theta$  and  $\operatorname{cosec}(90^\circ - \theta) = \sec \theta$ . So

$$\begin{aligned}\sec 76^\circ + \operatorname{cosec} 52^\circ &= \sec(90^\circ - 14^\circ) + \operatorname{cosec}(90^\circ - 38^\circ) \\ &= \operatorname{cosec} 14^\circ + \sec 38^\circ\end{aligned}$$

Thus the desired expression is  $\boxed{\operatorname{cosec} 14^\circ + \sec 38^\circ}$

(iv) We know  $\sec(90^\circ - \theta) = \operatorname{cosec} \theta$  and  $\cos(90^\circ - \theta) = \sin \theta$

$$\begin{aligned}\cos 78^\circ + \sec 78^\circ &= \cos(90^\circ - 12^\circ) + \sec(90^\circ - 12^\circ) \\ &= \sin 12^\circ + \operatorname{cosec} 12^\circ\end{aligned}$$

Thus the desired expression is  $\boxed{\sin 12^\circ + \operatorname{cosec} 12^\circ}$

(v) We know  $\sin(90^\circ - \theta) = \cos \theta$  and  $\operatorname{cosec}(90^\circ - \theta) = \sec \theta$ . So

$$\begin{aligned}\operatorname{cosec} 54^\circ + \sin 72^\circ &= \operatorname{cosec}(90^\circ - 36^\circ) + \sin(90^\circ - 18^\circ) \\ &= \sec 36^\circ + \cos 18^\circ\end{aligned}$$

Thus the desired expression is  $\boxed{\sec 36^\circ + \cos 18^\circ}$

(vi) We know that  $\cot(90^\circ - \theta) = \tan \theta$  and  $\cos(90^\circ - \theta) = \sin \theta$ . So

$$\begin{aligned}\cot 85^\circ + \cos 75^\circ &= \cot(90^\circ - 5^\circ) + \cos(90^\circ - 15^\circ) \\ &= \tan 5^\circ + \sin 15^\circ\end{aligned}$$

Thus the desired expression is  $\boxed{\tan 5^\circ + \sin 15^\circ}$

(vii) We know that  $\sin(90^\circ - \theta) = \cos \theta$  and  $\cos(90^\circ - \theta) = \sin \theta$ . So

$$\begin{aligned}\sin 67^\circ + \cos 75^\circ &= \sin(90^\circ - 23^\circ) + \cos(90^\circ - 15^\circ) \\ &= \cos 23^\circ + \sin 15^\circ\end{aligned}$$

Thus the desired expression is  $\boxed{\cos 23^\circ + \sin 15^\circ}$

Trigonometric Ratios Ex 5.3 Q4

**Answer :**

$$\begin{aligned}\text{Given that: } & \cos 75^\circ + \cot 75^\circ \\ &= \cos 75^\circ + \cot 75^\circ \\ &= \cos(90^\circ - 15^\circ) + \cot(90^\circ - 15^\circ) \\ &= \sin 15^\circ + \tan 15^\circ\end{aligned}$$

Hence the correct answer is  $\boxed{\sin 15^\circ + \tan 15^\circ}$

Trigonometric Ratios Ex 5.3 Q5

**Answer :**

We are given  $3A$  is an acute angle

$$\begin{aligned}\text{We have: } & \sin 3A = \cos(A - 26^\circ) \\ \Rightarrow & \sin 3A = \sin(90^\circ - (A - 26^\circ)) \\ \Rightarrow & \sin 3A = \sin(116^\circ - A) \\ \Rightarrow & 3A = 116^\circ - A \\ \Rightarrow & 4A = 116^\circ \\ \Rightarrow & A = \boxed{29^\circ}\end{aligned}$$

Hence the correct answer is  $\boxed{29^\circ}$

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