

5.5 Exercises: p. 411; * 1-3, 5-8, 11, 12, 15, 17, 18, 23, 25, 26, 29, 30, 33,
35, 39, 40-42

1) sine interval: $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$ $\sin^{-1}x = y \Leftrightarrow \sin y = x$

$$\sin^{-1}\left(\frac{1}{2}\right) = 30^\circ\left(\frac{\pi}{6}\right) \text{ since } \sin 30^\circ = \frac{1}{2}$$

b) cosine domain: $0 \leq x \leq \pi$ $\cos^{-1}x = y \Leftrightarrow \cos y = x$

$$\cos^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{3} \text{ since } \cos\left(\frac{\pi}{3}\right) = \frac{1}{2}$$

2) valid in $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$ b is not true

$$\sin^{-1}\left(\sin\frac{10\pi}{3}\right) = -\frac{\pi}{3}$$

a) $\sin^{-1}(1) = \frac{\pi}{2} (90^\circ)$ since $\sin\frac{\pi}{2} = 1$

b) $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right) = \frac{\pi}{3}$ since $\sin\frac{\pi}{3} = \frac{\sqrt{3}}{2}$

c) $\sin^{-1}(2) = \emptyset$ since sin never = 2

4 a) $\sin^{-1}(-1) = -\frac{\pi}{2}$ b) $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right) = \frac{\pi}{4}$ c) $\sin^{-1}(-2) = \emptyset$

5 a) $\cos^{-1}(-1) = \pi$ b) $\cos^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{3}$ c) $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) = \frac{5\pi}{6}$

6 a) $\cos^{-1}\left(\frac{\sqrt{2}}{2}\right) = \frac{\pi}{4}$ b) $\cos^{-1}(1) = 0$ c) $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right) = \frac{3\pi}{4}$

7 a) $\tan^{-1}(-1) = -\frac{\pi}{4}$ b) $\tan^{-1}\left(\sqrt{3}\right) = \frac{\pi}{3}$ c) $\tan^{-1}\left(\frac{\sqrt{3}}{3}\right) = \frac{\pi}{6}$

8 a) $\tan^{-1}(0) = 0$ b) $\tan^{-1}(-\sqrt{3}) = -\frac{\pi}{3}$ c) $\tan^{-1}\left(-\frac{\sqrt{3}}{3}\right) = -\frac{\pi}{6}$

11) $\sin^{-1}\left(\frac{2}{3}\right) = 0.72973$ 12) $\sin^{-1}\left(-\frac{8}{9}\right) = -1.0949$

$$15) \cos^{-1}(-0.92761) = 2.75876 \quad 17) \tan^{-1}(10) = 1.47113$$

$$18) \tan^{-1}(-26) = -1.53235$$

$$23) \sin(\sin^{-1}(\frac{1}{4})) = \frac{1}{4}$$

$$25) \tan(\tan^{-1}(5)) = 5$$

$$26) \sin(\sin^{-1}(5)) = \phi$$

$$29) \cos^{-1}(\cos \frac{5\pi}{6}) = \frac{5\pi}{6}$$
$$\cos^{-1}(-\frac{\sqrt{3}}{2}) = \frac{5\pi}{6}$$

$$30) \tan^{-1}(\tan \frac{\pi}{4})$$
$$\tan^{-1}(\frac{\sqrt{2}}{2}) = \frac{\pi}{4}$$

$$33) \sin^{-1}(\sin \frac{5\pi}{6}) +$$
$$\sin^{-1}(\frac{1}{2}) = \frac{\pi}{6}$$

$$35) \cos^{-1}(\cos \frac{17\pi}{6}) +$$
$$\cos^{-1}(\frac{\sqrt{3}}{2}) = \frac{5\pi}{6}$$

$$39) \tan(\sin^{-1} \frac{1}{2})$$
$$\tan(\frac{\pi}{6}) = \frac{\sqrt{3}}{3}$$

$$40) \cos(\sin^{-1} 0)$$
$$\cos(0) = 1$$

$$41) \cos(\sin^{-1} \frac{\sqrt{3}}{2}) =$$
$$\cos(\frac{\pi}{6}) = \frac{1}{2}$$

$$42) \tan(\sin^{-1} \frac{\sqrt{2}}{2})$$

$$\tan(\frac{\pi}{4}) = 1$$