5. $\sin x = \frac{5}{13}, \operatorname{cosec} x = \frac{13}{5}, \cos x = -\frac{12}{13}, \sec x = -\frac{13}{12}, \cot x = -\frac{12}{5}$

6. $\frac{1}{\sqrt{2}}$ **7.** 2 **8.** $\sqrt{3}$ **9.** $\frac{\sqrt{3}}{2}$ **10.** 1

EXERCISE 3.3

5. (i) $\frac{\sqrt{3}+1}{2\sqrt{2}}$ (ii) $2 - \sqrt{3}$

EXERCISE 3.4

1. $\frac{\pi}{3}, \frac{4\pi}{3}, n\pi + \frac{\pi}{3}, n \in \mathbf{Z}$

2. $\frac{\pi}{3}, \frac{5\pi}{3}, 2n\pi \pm \frac{\pi}{3}, n \in \mathbf{Z}$

3. $\frac{5\pi}{6}, \frac{11\pi}{6}, n\pi + \frac{5\pi}{6}, n \in \mathbf{Z}$

4. $\frac{7\pi}{6}, \frac{11\pi}{6}, n\pi + (-1)^n \frac{7\pi}{6}, n \in \mathbf{Z}$

5. $x = \frac{n\pi}{3}$ or $x = n\pi, n \in \mathbf{Z}$

6. $x = (2n+1)\frac{\pi}{4}$, or $2n\pi \pm \frac{\pi}{3}, n \in \mathbf{Z}$

7. $x = n\pi + (-1)^n \frac{7\pi}{6}$ or $(2n+1)\frac{\pi}{2}, n \in \mathbf{Z}$

8. $x = \frac{n\pi}{2}$, or $\frac{n\pi}{2} + \frac{3\pi}{8}, n \in \mathbf{Z}$

9. $x = \frac{n\pi}{3}$, or $n\pi \pm \frac{\pi}{3}, n \in \mathbf{Z}$

Miscellaneous Exercise on Chapter 3

8. $\frac{2\sqrt{5}}{5}, \frac{\sqrt{5}}{5}, \frac{1}{2}$

9. $\frac{\sqrt{6}}{3}, -\frac{\sqrt{3}}{3}, -\sqrt{2}$

10. $\frac{\sqrt{8+2\sqrt{15}}}{4}, \frac{\sqrt{8-2\sqrt{15}}}{4}, 4+\sqrt{15}$

EXERCISE 5.1

1. $3 + i0$ **2.** $0 + i\,0$ **3.** $0+i\,1$ **4.** $14 + 28\,i$

5. $2 - 7\,i$ **6.** $-\frac{19}{5}-\frac{21i}{10}$ **7.** $\frac{17}{3}+i\frac{5}{3}$ **8.** $-4 + i\,0$

9. $-\frac{242}{27}-26i$ **10.** $\frac{-22}{3}-i\frac{107}{27}$ **11.** $\frac{4}{25}+i\frac{3}{25}$ **12.** $\frac{\sqrt{5}}{14}-i\frac{3}{14}$

13. $0 + i1$ **14.** $0 - i\,\frac{7\sqrt{2}}{2}$

EXERCISE 5.2

1. $2, \frac{-2\pi}{3}$ **2.** $2, \frac{5\pi}{6}$ **3.** $\sqrt{2}\left(\cos\frac{-\pi}{4}+i\sin\frac{-\pi}{4}\right)$

4. $\sqrt{2}\left(\cos\frac{3\pi}{4}+i\sin\frac{3\pi}{4}\right)$ **5.** $\sqrt{2}\left(\cos\frac{-3\pi}{4}+i\sin\frac{-3\pi}{4}\right)$

6. $3\,(\cos\pi + i\,\sin\pi)$ **7.** $2\left(\cos\frac{\pi}{6}+i\sin\frac{\pi}{6}\right)$ **8.** $\cos\frac{\pi}{2}+i\sin\frac{\pi}{2}$

EXERCISE 5.3

1. $\pm\sqrt{3}\,i$ **2.** $\frac{-1\pm\sqrt{7}\,i}{4}$ **3.** $\frac{-3\pm 3\sqrt{3}\,i}{2}$ **4.** $\frac{-1\pm\sqrt{7}i}{-2}$

5. $\frac{-3\pm\sqrt{11}\,i}{2}$ **6.** $\frac{1\pm\sqrt{7}\,i}{2}$ **7.** $\frac{-1\pm\sqrt{7}\,i}{2\sqrt{2}}$ **8.** $\frac{\sqrt{2}\pm\sqrt{34}\,i}{2\sqrt{3}}$

9. $\frac{-1\pm\sqrt{(2\sqrt{2}-1)}\,i}{2}$ **10.** $\frac{-1\pm\sqrt{7}\,i}{2\sqrt{2}}$