

Solution to Practice 3c

B5(a)

$$\begin{aligned}\frac{1}{3+4i} &= \frac{(1)(3-4i)}{(3+4i)(3-4i)} \\ &= \frac{3-4i}{3^2+4^2} \\ &= \frac{3}{25} - \frac{4}{25}i\end{aligned}$$

B5(b)

$$\begin{aligned}\frac{2}{3-5i} &= \frac{(2)(3+5i)}{(3-5i)(3+5i)} \\ &= \frac{6+10i}{3^2+5^2} \\ &= \frac{6}{34} - \frac{10}{34}i \\ &= \frac{3}{17} - \frac{5}{17}i\end{aligned}$$

B5(c)

$$\begin{aligned}\frac{1-4i}{3+5i} &= \frac{(1-4i)(3-5i)}{(3+5i)(3-5i)} \\ &= \frac{(1)(3)+(1)(-5i)+(-4i)(3)+(-4i)(-5i)}{3^2+5^2} \\ &= \frac{(3-20)+(-5-12)i}{9+25} \\ &= -\frac{17}{34} - \frac{17}{34}i \\ &= -\frac{1}{2} - \frac{1}{2}i\end{aligned}$$

B5(d)

$$\begin{aligned}\frac{1+4i}{4-5i} &= \frac{(1+4i)(4+5i)}{(4-5i)(4+5i)} \\ &= \frac{(1)(4)+(1)(5i)+(4i)(4)+(4i)(5i)}{4^2+5^2} \\ &= \frac{(4-20)+(5+16)i}{16+25} \\ &= -\frac{16}{41} + \frac{21}{41}i\end{aligned}$$