

4.3

$$\begin{aligned}
 1) \quad (3 + 4i)^2 &= 3^2 + 2 \cdot 3 \cdot 4i + (4i)^2 \\
 &= 9 + 24i - 16 \\
 &= -7 + 24i
 \end{aligned}$$

$$\begin{aligned}
 2) \quad (4 - 6i)^3 &= 4^3 - 3 \cdot 4^2 \cdot 6i + 3 \cdot 4 \cdot (6i)^2 - (6i)^3 \\
 &= 64 - 288i - 432 + 216i \\
 &= -368 - 72i
 \end{aligned}$$

$$\begin{aligned}
 3) \quad (i - 2i^2)^3 &= (i + 2)^3 \\
 &= i^3 + 3 \cdot i^2 \cdot 2 + 3 \cdot i \cdot 2^2 + 2^3 \\
 &= -i - 6 + 12i + 8 \\
 &= 2 + 11i
 \end{aligned}$$

$$\begin{aligned}
 4) \quad (2 - i)^4 &= ((2 - i)^2)^2 \\
 &= (2^2 - 2 \cdot 2 \cdot i + i^2)^2 \\
 &= (4 - 4i - 1)^2 \\
 &= (3 - 4i)^2 \\
 &= 3^2 - 2 \cdot 3 \cdot 4i + (4i)^2 \\
 &= 9 - 24i - 16 \\
 &= -7 - 24i
 \end{aligned}$$

$$\begin{aligned}
 5) \quad (2 - i)(3 + 4i)(5 - i) &= (6 + 8i - 3i - 4i^2)(5 - i) \\
 &= (6 + 5i + 4)(5 - i) \\
 &= (10 + 5i)(5 - i) \\
 &= 50 - 10i + 25i + 5 \\
 &= 55 + 15i
 \end{aligned}$$

$$\begin{aligned}
 6) \quad (1 - 3i)^2(-8 + 6i) &= (1^2 - 2 \cdot 1 \cdot 3i + (3i)^2)(-8 + 6i) \\
 &= (1 - 6i - 9)(-8 + 6i) \\
 &= (-8 - 6i)(-8 + 6i) \\
 &= 64 - 48i + 48i + 36 \\
 &= 100
 \end{aligned}$$

$$\begin{aligned}
 7) \quad (1 - i)^3 &= 1^3 - 3 \cdot 1^2 \cdot i + 3 \cdot 1 \cdot i^2 - i^3 \\
 &= 1 - 3i - 3 + i \\
 &= -2 - 2i
 \end{aligned}$$

$$\begin{aligned}
 8) \quad (2 + i)^3 &= 2^3 + 3 \cdot 2^2 \cdot i + 3 \cdot 2 \cdot i^2 + i^3 \\
 &= 8 + 12i - 6 - i \\
 &= 2 + 11i
 \end{aligned}$$

$$9) \quad (\sqrt{2} - 3i)(-\sqrt{2} - 3i) = -2 - 3\sqrt{2}i + 3\sqrt{2}i + 9i^2 = -2 - 9 = -11$$