

099 § 7.7 #5 1-84, every 4th

#5 1-8 Write in terms of i

$$\textcircled{1} \sqrt{-24} = i\sqrt{24} = i\sqrt{4} \sqrt{6} = \boxed{2i\sqrt{6}}$$

$$\textcircled{5} 8\sqrt{-63} = 8i\sqrt{63} = 8i\sqrt{9} \sqrt{7} = \boxed{24i\sqrt{7}}$$

#5 9-18 Multiply or Divide

$$\textcircled{9} \sqrt{-2} \sqrt{-7} = i\sqrt{2} i\sqrt{7} = i^2 \sqrt{14} = \boxed{-\sqrt{14}}$$

$$\textcircled{13} \sqrt{16} \sqrt{-1} = \boxed{4i} \quad \text{BE CAREFUL!}$$

$\sqrt{-2} \sqrt{-7} \neq \sqrt{(-2)(-7)} = +\sqrt{14}$

$$\textcircled{15} \frac{\sqrt{-9}}{\sqrt{3}} = \frac{3i}{\sqrt{3}} = \left(\frac{3i}{\sqrt{3}}\right) \left(\frac{\sqrt{3}}{\sqrt{3}}\right) = \frac{3i\sqrt{3}}{3} = \boxed{i\sqrt{3}}$$

$$\textcircled{17} \frac{\sqrt{-80}}{\sqrt{-10}} = \frac{i\sqrt{4} \sqrt{4} \sqrt{5}}{i\sqrt{10}} = \frac{2 \cdot 2 i\sqrt{5}}{i\sqrt{10}} = \left(\frac{4\sqrt{5}}{\sqrt{10}}\right) \left(\frac{\sqrt{10}}{\sqrt{10}}\right)$$
$$= \frac{4\sqrt{50}}{10} = \frac{4\sqrt{25} \sqrt{2}}{10} = \frac{4 \cdot 5 \sqrt{2}}{10} = \frac{4\sqrt{2}}{2} = \boxed{2\sqrt{2}}$$

#5 19-24 Add or subtract. Write the sum or difference in the form $a+bi$.

$$\textcircled{21} (6+5i) - (8-i) = 6+5i-8+i = \boxed{-2+6i}$$

#5 25-32 Multiply. Write the product in the form $a+bi$.

099 § 7.7 #s 25, 29, u, 34

$$(25) -10i \cdot -4i \text{ uck}$$

$$(-10i)(-4i) \text{ is the way to write it.}$$
$$= 40i^2 = \boxed{-40}$$

$$(29) (\sqrt{3} + 2i)(\sqrt{3} - 2i) = (\sqrt{3})^2 - (2i)^2$$

$$= 3 - 4i^2 = 3 + 4 = \boxed{7} \quad (a-b)^2 = a^2 - 2ab + b^2$$

$$(31) (4 - 2i)^2 = 4^2 - 2(4)(2i) + (2i)^2$$

$$= 16 - 16i + 4i^2 = 16 - 16i - 4 = \boxed{12 - 16i}$$

#s 33-40 Write each quotient in the form $a+bi$:

$$(33) \frac{4}{i} = \left(\frac{4}{i}\right)\left(\frac{-i}{-i}\right) = \frac{-4i}{-i^2} = \frac{-4i}{-(-1)} = \boxed{-4i}$$

$$(37) \frac{3+5i}{1+i} = \left(\frac{3+5i}{1+i}\right)\left(\frac{1-i}{1-i}\right) = \frac{3-3i+5i-5i^2}{1^2+1^2}$$
$$= \frac{3+2i+5}{2} = \frac{8+2i}{2} = \boxed{4+i}$$

099 § 7.7 #s 41, ..., 84, 132

#s 41-72 Perform each indicated operation.
Write the result in the form $a+bi$.

$$(41) (7i)(-9i) = -63i^2 = \boxed{63}$$

$$(45) -3i(-1+9i) = 3i - 27i^2 = 3i + 27 = \boxed{27+3i}$$

$$(49) (4+i)(5+2i) = 20 + 8i + 5i + 2i^2 \\ = 20 + 13i - 2 = \boxed{18+13i}$$

$$(53) (8-3i) + (2+3i) = \boxed{10}$$

$$(57) \left(\frac{16+15i}{-3i} \right) = \left(\frac{16+15i}{-3i} \right) \left(\frac{3i}{3i} \right) = \frac{48i + 45i^2}{-9i^2} \\ = \frac{-45}{9} + \frac{48i}{9} = -5 + \frac{48}{9}i = \boxed{-5 + \frac{16}{3}i}$$

$$(61) \frac{2}{2+i} = \left(\frac{2}{2+i} \right) \left(\frac{2-i}{2-i} \right) = \frac{4-2i}{2^2+1^2} = \frac{4-2i}{5} = \boxed{\frac{4}{5} - \frac{2}{5}i}$$

Miscopy:

$$\left(\frac{2}{3+i} \right) \left(\frac{3-i}{3-i} \right) = \frac{6-2i}{3^2+1^2} = \frac{6-2i}{9+1} = \frac{6}{10} - \frac{2}{10}i = \boxed{\frac{3}{5} - \frac{1}{5}i}$$

099 §7.7 #s 65, 69, m, 84, 8L

$$\begin{aligned} (65) \quad \frac{2-3i}{2+i} &= \left(\frac{2-3i}{2+i} \right) \left(\frac{2-i}{2-i} \right) = \frac{4-2i-6i+3i^2}{2^2+1^2} \\ &= \frac{4-8i-3}{5} = \frac{1-8i}{5} = \boxed{\frac{1}{5} - \frac{8}{5}i} \end{aligned}$$

$$\begin{aligned} (69) \quad (\sqrt{3} + 2i)(\sqrt{3} - 2i) &= (\sqrt{3})^2 + 2^2 = 3+4 = \boxed{7} \\ (a+bi)(a-bi) &= a^2+b^2 \end{aligned}$$

#s 73-84 Find each power of i .

$$(73) \quad i^8 = i^{(2)(4)} = (i^2)^4 = (-1)^4 = 1$$

$$\begin{aligned} (77) \quad i^{11} &= i^{10+1} = i^{10} i^1 = i^{(2)(5)} i^1 \\ &= (i^2)^5 i^1 = (-1)^5 i = \boxed{-i} \end{aligned}$$

$$(81) \quad (2i)^6 = 2^6 i^6 = 64 (i^2)^3 = 64 (-1)^3 = \boxed{-64}$$