

In 1 - 15, write each given power of i in simplest terms as 1, i , -1 , or $-i$. Show how you arrived at your answer.

<p>1. $i^{12} = 1$</p> <p>$4 \overline{) 12}$ $\underline{12}$ $0 \rightarrow R$</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> $i^0 = 1$ $i^1 = i$ $i^2 = -1$ $i^3 = -i$ $i^4 = 1$ </div>	<p>2. $i^7 = -i$</p> <p>$4 \overline{) 7}$ $\underline{4}$ 3</p>	<p>3. $i^{49} = i$</p> <p>$4 \overline{) 49}$ $\underline{48}$ 1</p>
<p>4. $i^{72} = 1$</p> <p>$4 \overline{) 72}$ $\underline{72}$ 0</p>	<p>5. $i^{54} = -1$</p> <p>$4 \overline{) 54}$ $\underline{52}$ 2</p>	<p>6. $i^{99} = -i$</p> <p>$4 \overline{) 99}$ $\underline{96}$ 3</p>
<p>7. $i^{300} = 1$</p> <p>$4 \overline{) 300}$ $\underline{280}$ 20 $\underline{20}$ 0</p>	<p>8. $i^{246} = -1$</p> <p>$4 \overline{) 246}$ $\underline{240}$ 6 $\underline{4}$ 2</p>	<p>9. $i^{91} = -i$</p> <p>$4 \overline{) 91}$ $\underline{88}$ 3</p>
<p>10. $i^{473} = i$</p> <p>$4 \overline{) 473}$ $\underline{440}$ 33 $\underline{32}$ 1</p>	<p>11. $i^{1331} = -i$</p> <p>$4 \overline{) 1331}$ $\underline{1200}$ 131 $\underline{128}$ 3</p>	<p>12. $i^{2001} = i$</p> <p>$4 \overline{) 2001}$ $\underline{2000}$ 1</p>
<p>13. $(3i^4)(8i^{10})$ $24i^{14} = 24(-1)$ $4 \overline{) 24}$ $\underline{24}$ 0</p> <p>= -24</p>	<p>14. $i^8 \cdot i^9 \cdot i^{10}$ $= i^{27} = -i$</p> <p>$4 \overline{) 27}$ $\underline{24}$ 3</p>	<p>15. $(2i^4)(8i^7)(i^5)(i^{10})$ $16i^{26} = 16(-1)$ $4 \overline{) 16}$ $\underline{16}$ 0</p> <p>= -16</p>

Simplify Each Radical

16. $\sqrt{-112}$
 $\sqrt{-1} \cdot \sqrt{112}$
 $\sqrt{-1} \cdot \sqrt{16} \cdot \sqrt{7}$
 $4i\sqrt{7}$

17. $\sqrt{-128}$
 $\sqrt{-1} \cdot \sqrt{128}$
 $\sqrt{-1} \cdot \sqrt{64} \cdot \sqrt{2}$
 $8i\sqrt{2}$

18. $4\sqrt{-54}$
 $4 \cdot \sqrt{-1} \cdot \sqrt{54}$
 $4 \cdot \sqrt{-1} \cdot \sqrt{9} \cdot \sqrt{6}$
 $4 \cdot 3 \cdot i \cdot \sqrt{6}$
 $12i\sqrt{6}$

19. $3i\sqrt{-36}$
 $3i\sqrt{-1} \cdot \sqrt{36}$
 $3i \cdot i \cdot 6$
 $18i^2$
 $18(-1)$
 -18

$$\textcircled{20} \quad 5\sqrt{-100}$$

$$5 \cdot \sqrt{-1} \cdot \sqrt{100}$$

$$5 \cdot i = 10$$

$$\boxed{50i}$$

$$\textcircled{21} \quad 7\sqrt{-96}$$

$$7 \cdot \sqrt{-1} \cdot \sqrt{96}$$

$$7 \cdot \sqrt{-1} \cdot \sqrt{16} \cdot \sqrt{6}$$

$$7 \cdot i \cdot 4 \cdot \sqrt{6}$$

$$\boxed{28i\sqrt{6}}$$

$$\textcircled{22} \quad i\sqrt{-180}$$

$$i \cdot \sqrt{-1} \cdot \sqrt{180}$$

$$i \cdot \sqrt{-1} \cdot \sqrt{36} \cdot \sqrt{5}$$

$$i \cdot i \cdot 6 \cdot \sqrt{5}$$

$$6i^2\sqrt{5}$$

$$6(-1)\sqrt{5}$$

$$\boxed{-6\sqrt{5}}$$

$$\textcircled{24} \quad \sqrt{-49}$$

$$\boxed{7i}$$

$$\textcircled{25} \quad \sqrt{64}$$

$$\boxed{8}$$

$$\textcircled{26} \quad \sqrt{16}$$

$$\boxed{4}$$

$$\textcircled{27} \quad \sqrt{144}$$

$$\boxed{12}$$

$$\textcircled{28} \quad \sqrt{-25}$$

$$\boxed{5i}$$

$$\textcircled{29} \quad \sqrt{36}$$

$$\boxed{6}$$

$$\textcircled{30} \quad 7i^3\sqrt{-512}$$

$$7i^3\sqrt{-1} \cdot \sqrt{512}$$

$$7i^3 \cdot \sqrt{-1} \cdot \sqrt{64} \cdot \sqrt{8}$$

$$7i^3 \sqrt{-1} \cdot \sqrt{64} \sqrt{4} \cdot \sqrt{2}$$

$$7i^3 \cdot i \cdot 8 \cdot 2 \cdot \sqrt{2}$$

$$112 i^4 \sqrt{2}$$

$$112(1)\sqrt{2} \longrightarrow$$

$$\boxed{112\sqrt{2}}$$