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## Written Exercises

**Simplify.**

1. $\sqrt{-81}$
2. $\sqrt{-121}$
3. $-4\sqrt{-36}$
4. $-2\sqrt{-144}$
5. $\sqrt{-20}$
6. $\sqrt{-75}$
7. $3\sqrt{-8}$
8. $5\sqrt{-27}$
9. $2i \cdot 3i$
10. $5i \cdot 3i$
11. $\sqrt{7} \cdot \sqrt{-7}$
12. $\sqrt{-6} \cdot \sqrt{2}$
13. $\sqrt{-5} \cdot \sqrt{-10}$
14. $\sqrt{-3} \cdot \sqrt{-6}$
15. $(7i)^2$
16. $(8i)^2$
17. $(-i)^2$
18. $(-5i)^2$
19. $(i\sqrt{2})^2$
20. $(3i\sqrt{5})^2$
21. $(-i\sqrt{3})^2$
22. $(-3i\sqrt{6})^2$
23. $-\frac{2}{i}$
24. $\frac{8}{3i}$

**Simplify.**

25. $\frac{1}{\sqrt{-5}}$
26. $\frac{4}{\sqrt{-4}}$
27. $\frac{\sqrt{18}}{2i\sqrt{6}}$
28. $\frac{\sqrt{28}}{4i\sqrt{7}}$
29. $\frac{\sqrt{60}}{\sqrt{-15}}$
30. $-\frac{\sqrt{12}}{\sqrt{-18}}$

**Solve.**

31. $x^2 + 144 = 0$
32. $y^2 + 400 = 0$
33. $2w^2 = -98$
34. $5t^2 = -20$
35. $3u^2 + 40 = 4$
36. $4z^2 + 39 = 7$

**Simplify.**

37. *a.* $\sqrt{-25} + \sqrt{-36}$ *b.* $\sqrt{-25} \cdot \sqrt{-36}$
38. *a.* $\sqrt{-3} + \sqrt{-27}$ *b.* $\sqrt{-3} \cdot \sqrt{-27}$
39. *a.* $3\sqrt{-2} - \sqrt{-50}$ *b.* $3\sqrt{-2} \cdot (-\sqrt{-50})$
40. *a.* $2\sqrt{-24} - \sqrt{-54}$ *b.* $2\sqrt{-24} \cdot (-\sqrt{-54})$
41. *a.* $i\sqrt{18} + \sqrt{-8}$ *b.* $i\sqrt{18} \cdot \sqrt{-8}$
42. *a.* $i\sqrt{-98} - \sqrt{98}$ *b.* $i\sqrt{-98} \cdot (-\sqrt{98})$

**Simplify. Assume that each variable represents a positive number.**

43. $\sqrt{-12a} \cdot \sqrt{-3a}$
44. $-\sqrt{18c} \cdot \sqrt{-2c^3}$
45. $\sqrt{-\frac{r}{5}} \cdot \sqrt{\frac{-20}{r}}$
46. $\sqrt{-\frac{t^5}{2}} \cdot \sqrt{-\frac{2}{t^3}}$
47. $\sqrt{-3c^2} + \sqrt{-27c^2} - \sqrt{-45c^2}$
48. $\sqrt{-2t^5} + \sqrt{-8t^5} - \sqrt{-18t^5}$
49. $\sqrt{-4r^3} + \sqrt{-64r^3} - 4r\sqrt{-16r}$
50. $\sqrt{-25a^3} - \sqrt{-225a^3} + 20a\sqrt{-a}$
51. $\sqrt{-x^5} + x\sqrt{-25x^2} - x^2\sqrt{-25x}$
52. $yi\sqrt{-16y^2} + \sqrt{16y^4} - y^2i\sqrt{-9}$
53. Simplify $i^n$ for $n = 2, 3, 4, \ldots, 12$. What pattern do you see?
54. Simplify: **a.** $i^{100}$ **b.** $i^{101}$ **c.** $i^{102}$ **d.** $i^{103}$

## Mixed Review Exercises

**Solve. If an equation has no real solutions, say so.**

1. $\sqrt{2x - 3} = 5$
2. $15 - 2n = n^2$
3. $\sqrt{y^2 + 12} = 2y$
4. $\frac{3y - 4}{5} = \frac{y + 1}{2}$
5. $\frac{1}{n} + \frac{2}{n - 2} = \frac{4}{n(n - 2)}$
6. $2\sqrt[3]{x} + 9 = 5$
7. $y = \sqrt{5y - 6}$
8. $5|n| - 7 = 3$
9. $x = 2 + \sqrt{x + 4}$

**Classify each real number as either rational or irrational.**

10. $\sqrt[3]{-125}$
11. $3.7\overline{82}$
12. $\sqrt[5]{12}$
13. $0.121121112\ldots$