

4-4 Practice**Complex Numbers**

Simplify.

1. $\sqrt{-36}$
 $6i$

2. $\sqrt{-8} \cdot \sqrt{-32}$
 -16

3. $\sqrt{-15} \cdot \sqrt{-25}$
 $-5\sqrt{15}$

4. $(-3i)(4i)(-5i)$
 $-60i$

5. $(7i)^2(6i)$
 $-294i$

6. i^{42}
 -1

7. i^{55}
 $-i$

8. i^{89}
 i

9. $(5 - 2i) + (-13 - 8i)$
 $-8 - 10i$

10. $(7 - 6i) + (9 + 11i)$
 $16 + 5i$

11. $(-12 + 48i) + (15 + 21i)$
 $3 + 69i$

12. $(10 + 15i) - (48 - 30i)$
 $-38 + 45i$

13. $(28 - 4i) - (10 - 30i)$
 $18 + 26i$

14. $(6 - 4i)(6 + 4i)$
 52

15. $(8 - 11i)(8 - 11i)$
 $-57 - 176i$

16. $(4 + 3i)(2 - 5i)$
 $23 - 14i$

17. $(7 + 2i)(9 - 6i)$
 $75 - 24i$

18. $\frac{6 + 5i}{-2i} - \frac{5}{2} + 3i$

19. $\frac{2}{7 - 8i} - \frac{14}{113} + \frac{16}{113}i$

20. $\frac{3 - i}{2 - i} - \frac{7}{5} + \frac{1}{5}i$

21. $\frac{2 - 4i}{1 + 3i} - 1 - i$

Solve each equation.

22. $5n^2 + 35 = 0$ **$\pm i\sqrt{7}$**

23. $2m^2 + 10 = 0$ **$\pm i\sqrt{5}$**

24. $4m^2 + 76 = 0$ **$\pm i\sqrt{19}$**

25. $-2m^2 - 6 = 0$ **$\pm i\sqrt{3}$**

26. $-5m^2 - 65 = 0$ **$\pm i\sqrt{13}$**

27. $\frac{3}{4}x^2 + 12 = 0$ **$\pm 4i$**

Find the values of ℓ and m that make each equation true.

28. $15 - 28i = 3\ell + (4m)i$ **5, -7**

29. $(6 - \ell) + (3m)i = -12 + 27i$ **18, 9**

30. $(3\ell + 4) + (3 - m)i = 16 - 3i$ **4, 6**

31. $(7 + m) + (4\ell - 10)i = 3 - 6i$ **1, -4**

32. ELECTRICITY The impedance in one part of a series circuit is $1 + 3j$ ohms and the impedance in another part of the circuit is $7 - 5j$ ohms. Add these complex numbers to find the total impedance in the circuit. **$8 - 2j$ ohms**

33. ELECTRICITY Using the formula $E = IZ$, find the voltage E in a circuit when the current I is $3 - j$ amps and the impedance Z is $3 + 2j$ ohms. **$11 + 3j$ volts**