

Simplify: Remember to use the imaginary number i .

1. $\sqrt{-81}$

$9i$

2. $\sqrt{-7}$

$i\sqrt{7}$

3. $\sqrt{-50}$

$5i\sqrt{2}$

4. $\sqrt{-32}$

$4i\sqrt{2}$

5. $3\sqrt{-9}$

$3i\sqrt{9}$
 $9i$

6. $-\sqrt{-100}$

$-i\sqrt{100}$
 $-10i$

Standard Form: Simplify each complex number and write in standard form (i.e. $a + bi$)

7. $2 + \sqrt{-3}$

$2 + i\sqrt{3}$

8. $\sqrt{-8} + 8$

$8 + 2i\sqrt{2}$

9. $\sqrt{-1} + 2$

$2 + i$

Simplify: Remember: $i = \sqrt{-1}$, $i^2 = -1$, $i^3 = -i$, $i^4 = 1$

10. i^4

1

11. i^{12}

1

$12/4 = 3$
 $(i^4)^3$

12. i^{15}

$15/4 = 3 R 3$
 $(i^4)^3 + i^3$
 $= -i$

13. i^{37}

$37/4 = 9 R 1$
 $(i^4)^9 \cdot i$

i

14. i^{95}

$-i$

15. i^{100}

1

Simplify: Perform the indicated operation and write the result in standard form.

16. $(2 + 4i) + (4 - i)$

$6 + 3i$

17. $(-3 - 5i) + (4 - 2i)$

$1 - 7i$

18. $6 - (8 + 3i)$

$6 - 8 - 3i$

$-2 - 3i$

19. $(12 + 5i) - (2 - i)$

$12 + 5i - 2 + i$

$10 + 6i$

20. $(-6 - 7i) - (1 + 3i)$

$-6 - 7i - 1 - 3i$

$-7 - 10i$

21. $(4 - 3i)(5 + 2i)$

$20 + 8i - 15i - 6i^2$
 $20 - 7i - 6(-1)$

$26 - 7i$

22. $(-6 - 5i)(1 + 3i)$

$-6 - 18i - 5i - 15i^2$

$-6 - 23i - 15(-1)$

$-6 - 23i + 15$

$9 - 23i$

23. $(8 + i)(2 + 7i)$

$16 + 56i + 2i + 7i^2$

$16 + 58i + 7(-1)$

$16 + 58i - 7$

$9 + 58i$

24. $(-6i)^2$

$(-6i)(-6i)$

$36i^2$

$36(-1)$

$= -36$

25. $(9 + 4i)^2$

$(9 + 4i)(9 + 4i)$

$81 + 36i + 36i + 16i^2$

$81 + 72i + 16(-1)$

$65 + 72i$

26. $\sqrt{-6} \cdot \sqrt{-2}$

$i\sqrt{6} \cdot i\sqrt{2}$

$i^2 \sqrt{12} = -1 \cdot 2\sqrt{3}$

$= -2\sqrt{3}$

$-1 \sqrt{12}$

$\frac{12}{2} = 6$

27. $(\sqrt{-10})^2$

$\sqrt{-10} \cdot \sqrt{-10}$

$i\sqrt{10} \cdot i\sqrt{10}$

$i^2 \cdot \sqrt{100}$

$-1 \cdot 10 = -10$

28. Challenge:

$\frac{4 + 2i}{3 - i} \cdot \frac{3 + i}{3 + i}$

29. Challenge:

$\frac{3 - 4i}{3 + 2i} \cdot \frac{3 - 2i}{3 - 2i}$

30. Challenge:

$\frac{-4 + 6i}{2 - 3i} \cdot \frac{2 + 3i}{2 + 3i}$