

Simplify. Write any complex number solutions in **standard form**.

1. $(-3+7i)-(9+12i)$

1. _____

2. $(-3-2i)(5-3i)$

2. _____

3. $(8-\sqrt{-27})+(9+\sqrt{-48})$

3. _____

4. $\sqrt{-32}(\sqrt{6}-\sqrt{-3})$

4. _____

5. $\sqrt{-49}+\sqrt{12}$

5. _____

6. $-5i(7-3i)$

6. _____

7. $\frac{-\sqrt{-64}}{\sqrt{-4}}$

7. _____

8. $\frac{5+2i}{3+4i}$

8. _____

9. $\frac{1}{2+i} + \frac{3+i}{2+3i}$

9. _____

10. i^{33}

10. _____

11. Find x and y : $7x-5yi = -28+25i$

11. _____

For #12-14, solve the equations, finding all real and imaginary solutions. Be sure to simplify all answers.

12. $5x^2 + 1 = -2x$

12. _____

13. $x^4 - 81 = 0$

13. _____

14. $3x^4 + 81x = 0$

14. _____

For #15-18, find a polynomial with real coefficients that satisfy the given conditions. Leave your answer in factored form without any imaginary numbers.

15. degree 5: zeros include 4 (multiplicity 3), and $3 - 4i$

15. _____

16. degree 2: zeros include $1 - 2i$; $f(2) = 4$

16. _____

17. Find **all** the zeros of the polynomial

$g(x) = x^4 - 2x^3 + 5x^2 - 8x + 4$, given 1 is a zero of multiplicity of 2.

17. _____

18. Find **all** the zeros of the polynomial

$g(x) = 2x^4 - x^3 + 7x^2 - 4x - 4$, given that $2i$ is a zero.

18. _____