Vertex Form → General Form → Factored Form

Instructions

For every quadratic function in Questions 1–14, complete the following steps in order:

a. Vertex form: **Identify the vertex**.
b. General form: Expand and simplify into $y = ax^2 + bx + c$. **Identify the y-intercept.**
c. Factored form: Factor the general form completely. **Identify the x-intercepts**.

Given: $y = (x - 2)^2 - 9$

a. Vertex
b. Expand → y-intercept
c. Factor completely → x-intercepts

MILD

1. $y = (x - 1)^2 - 4$
2. $y = (x + 2)^2 - 1$
3. $y = (x + 2)^2 - 9$
4. $y = (x - 3)^2 - 16$

MEDIUM

5. $y = 4(x - 1)^2 - 1$
6. $y = 4(x + 1)^2 - 9$
7. $y = 9(x - 1)^2 - 4$
8. $y = 9(x + 2)^2 - 16$

SPICY

Look for a greatest common factor before factoring the remaining trinomial.

9. $y = 2(x - 2)^2 - 18$
10. $y = 3(x - 1)^2 - 12$
11. $y = 8(x - 1)^2 - 2$
12. $y = -8(x + 1)^2 + 18$
13. $y = -18(x - 1)^2 + 8$

EXTRA SPICY

14. $y = -12(x + 2)^2 + 27$
15. $y = -20(x - 1)^2 + 45$

16. A learner wrote this conversion:

$$y = -4(x + 1)^2 + 9$$
$$y = -4x^2 - 8x + 5$$
$$y = -(2x + 1)(2x + 5)$$

a. Identify the error.
b. Correct the error, then identify the vertex, y-intercept, and both x-intercepts.

17. The vertex and factored forms are given. Reconstruct the missing general form; then identify the vertex, y-intercept and both x-intercepts.

Vertex form: $y = -12(x - 1)^2 + 75$

General form: _____

Factored form: $y = -3(2x - 7)(2x + 3)$

18. A learner stops factoring at $3(x^2 - 4x + 4)$. Is the expression completely factored? Explain, then write the completed factorization and identify its distinct x-intercept(s).