Algebra 2 Warmup — Foundations & Functions

Be kind to future-you: show steps and box final answers.

Quick Reminders (read me!)

Function: each input x has exactly one output y.   **Domain:** allowed x values.   **Range:** resulting y values.
Exponent rules: $a^m a^n = a^{m+n}$, $a^m/a^n = a^{m-n}$ (with $a \neq 0$), $(a^m)^n = a^{mn}$, $a^{-k} = 1/a^k$.
Solving tips: Keep equations balanced, combine like terms, and check restrictions (like denominators $\neq 0$).

SAT/ACT Tip

When evaluating $f(\text{something})$, treat the input like a blank: wherever you see x in the rule, drop the input in.

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1. **Evaluate/simplify by substitution.** Let $A = 3p - 2q$ and $B = \dfrac{p^2}{q}$. Compute A and B when $p = -2$ and $q = 4$. Then simplify $A + B$.

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2. **Solve the linear equation.** $4(2x - 3) - 5 = 3x + 7.$ Show your algebra and circle your final x.

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3. **Absolute value.**

   (a) Solve $|2x - 5| = 9$.

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(b) Solve the inequality $|x + 1| \leq 4$ and state the solution in interval notation.

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4. **Literal equation (solve for a variable).** Solve $F = \dfrac{9}{5}C + 32$ for C (isolate C in terms of F).

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5. **Exponent rules practice.** Simplify as a single power of a and b (no negative exponents): $\dfrac{(a^3 b^{-2})^2}{a^{-1} b^4}$. Then evaluate your simplified expression at $a = -2$, $b = \dfrac{1}{2}$.

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6. **Quadratic: factor and solve.**

(a) Solve $x^2 - 5x - 24 = 0$ by factoring.

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(b) The function $f(x) = x^2 - 5x - 24$ has which x-intercepts? (List as ordered pairs.)

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7. **Solve the system of equations.**

$$\begin{cases} 2x + 3y = 7 \\ 4x - y = 1 \end{cases}$$

Use any method (elimination or substitution). Show steps.

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8. **Function evaluation and structure.** Let $f(x) = 2x^2 - 3x + 1$.

   (a) Compute $f(-2)$.

   (b) Compute $f(k)$ (simplify).

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   (c) Compute and simplify $f(a + 1) - f(a)$.

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9. **Piecewise function practice.**

$$p(x) = \begin{cases} x + 4, & x < 0, \\ x^2, & 0 \le x \le 2, \\ 6, & x > 2 \ . \end{cases}$$

Evaluate $p(-3)$, $p(0)$, $p(2)$, $p(5)$ and briefly name which piece you used each time.

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10. **Modeling word problem (linear).** A ride-share charges a base fee of $2.50 plus $1.80 per mile.

(a) Write a function $C(m)$ giving total cost in dollars for m miles.

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(b) Find $C(6)$.

(c) You have \$20. What is the greatest whole number of miles you can ride?

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You did math today. Future-you approves.