

Polynomial Skills Diagnostic Assessment

Short pre-test, 25-question unit diagnostic, and targeted score profile

Algebra I & II

Print-friendly

Classroom diagnostic

Name: _____

Date: _____

Class / period: _____

Suggested time: 10 minutes

Directions Complete the short pre-test without notes or a calculator unless your teacher says otherwise. Show enough work to make your method visible. This is a diagnostic, not a grade.

Part 1: Short Polynomial Pre-Test

Use this 10-question check before a unit or tutoring plan. Two questions per skill area is a screen, not a diagnosis, so use the longer assessment when the total is below 7 or the answers are inconsistent.

1. Rewrite $4 - 3x^3 + 2x - x^2$ in standard form. Then state the degree and leading coefficient.

2. Let $p(x) = 2x^2 - 5x + 1$. Find $p(-2)$.

3. Simplify $(3x^2 - 4x + 7) + (2x^2 + x - 5)$.

4. Multiply $(x - 3)(x + 5)$.

5. Factor $6x^3 - 24x$ completely.

Short Polynomial Pre-Test - Continued

6. Factor $2x^2 + 7x + 3$.

7. Divide $x^3 + 2x^2 - 5x - 6$ by $x + 3$.

8. Find the remainder when $p(x) = x^3 - 4x + 1$ is divided by $x - 2$.

9. List the zeros and multiplicities of $f(x) = (x + 1)^2(x - 4)$.

10. For $g(x) = -2(x + 2)(x - 1)^2$, describe the end behavior and what the graph does at each zero.

Pre-Test Quick Score

Foundations 1-2	Operations 3-4	Factoring 5-6	Division 7-8	Graphs 9-10
___ / 2	___ / 2	___ / 2	___ / 2	___ / 2

Use the result 9-10: begin the unit. 7-8: begin with one targeted warm-up. 0-6: use the full diagnostic. A zero in any skill pair is a stronger signal than the total score.

Part 2: Full Polynomial Unit Diagnostic

Name: _____

Date: _____

Class / period: _____

Suggested time: 35-45 minutes

Directions Score one point per question. Show work for subtraction, multiplication, factoring, and division so the teacher can separate arithmetic slips from method gaps.

A. Vocabulary, Standard Form, and Evaluation

1. Rewrite $7 - 2x^4 + 5x^2 - x$ in standard form. State the degree, leading coefficient, and constant term.

2. Classify $3x^5 - x^2 + 4$ by degree and number of terms.

3. Circle the expression that is not a polynomial: $4x^3 - 2x + 1$, $3/x + x^2$, 5, or $2x^4 - 7x^2$.

4. For $-6x^3 + 2x^2 - 9$, state the coefficient of x^2 , the coefficient of x , and the constant term.

5. Let $p(x) = 3x^2 + x - 4$. Find $p(-2)$.

6. Let $q(x) = 4x^2 - 8x + 3$. Find $q(1/2)$.

7. If $f(x) = x^2 - 3x + 2$ and $g(x) = 2x + 1$, find $f(3) + g(-1)$.

B. Adding, Subtracting, and Multiplying

8. Add $(4x^3 - 2x + 5) + (x^3 + 6x^2 + 3x - 8)$.

9. Subtract $(5x^2 - 3x + 7) - (2x^2 + 4x - 1)$.

10. Two regions have areas $3x^2 - 2x + 6$ and $x^2 + 5x - 4$. Write a polynomial for their total area.

11. Multiply $3x(2x^2 - x + 4)$.

12. Multiply $(x + 6)(x - 2)$.

13. Multiply $(2x - 3)(x^2 + x + 4)$.

14. Expand $(3x - 5)^2$.

C. Factoring and Polynomial Division

15. Factor $12x^4 - 18x^3$.

16. Factor $x^2 - x - 20$.

17. Factor $6x^2 + 13x + 6$.

18. Factor $4x^3 - 36x$ completely.

19. Factor $x^3 + 2x^2 - 9x - 18$ completely.

20. Divide $2x^3 + 3x^2 - 11x - 6$ by $x + 3$.

21. Divide $x^3 - 5x + 7$ by $x - 2$. Write the quotient and remainder.

22. Is $x - 4$ a factor of $p(x) = x^3 - 6x^2 + 5x + 12$? Show the quickest check.

D. Zeros and Graphs

23. For $f(x) = (x + 3)(x - 1)^2$, list the zeros and state whether the graph crosses or touches at each one.

24. For $g(x) = -x^3 + 4x$, find the zeros and describe the end behavior.

25. Choose the equation whose graph has a zero at -2 where it touches, a zero at 1 where it crosses, and left-down/right-up end behavior: A. $(x + 2)^2(x - 1)$, B. $-(x + 2)(x - 1)^2$, C. $(x + 2)(x - 1)$, D. $-(x + 2)^2(x - 1)^2$.

Student Score Profile

Score one point per question. Record section totals before looking at the overall score; the section pattern is what determines the next assignment.

Skill area	Questions	Points	Secure	Developing	Needs work
Foundations	1-7	___ / 7	6-7	4-5	0-3
Operations	8-14	___ / 7	6-7	4-5	0-3
Factoring	15-19	___ / 5	4-5	3	0-2
Division	20-22	___ / 3	3	2	0-1
Zeros and graphs	23-25	___ / 3	3	2	0-1

Overall score: ___ / 25

Recommended starting assignment:

Overall bands 22-25: ready for advanced polynomial work. 18-21: generally ready with targeted review. 13-17: use structured remediation. 0-12: reteach prerequisite skills before a full polynomial unit.

Graph-Matching Remediation Activity

Match each graph to one equation from the bank and one feature description. Use zeros, multiplicity, degree, and leading coefficient; do not rely on the picture alone.

Equation bank - use each equation once

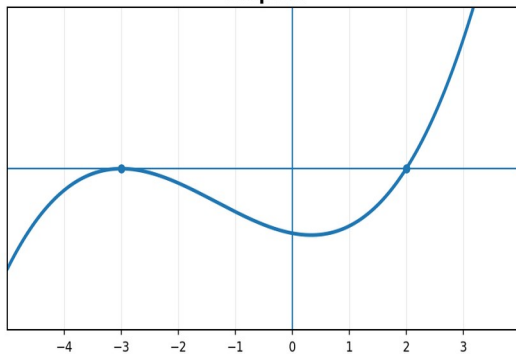
I. $y = -(x - 2)^2(x + 3)^2$

II. $y = (x + 3)(x - 2)$

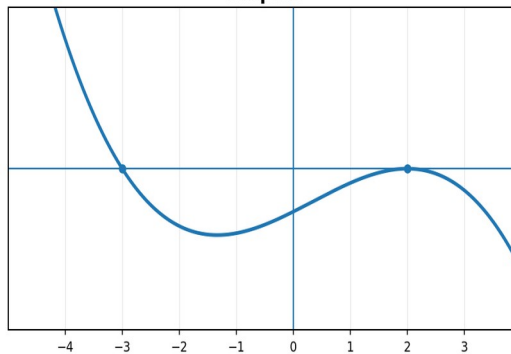
III. $y = (x + 3)^2(x - 2)$

IV. $y = -(x + 3)(x - 2)^2$

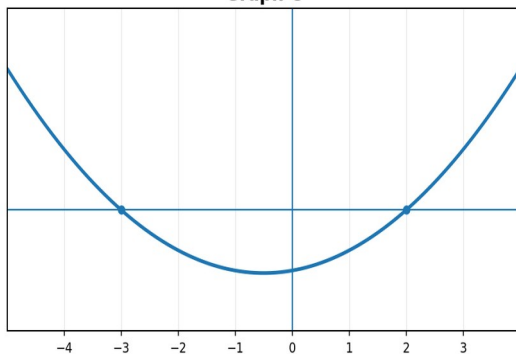
Graph A



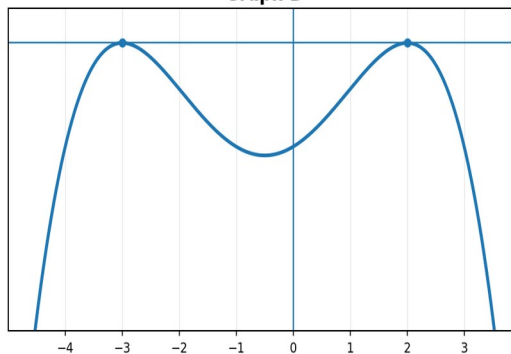
Graph B



Graph C



Graph D



1. Crosses at both $x = -3$ and $x = 2$; both ends rise. Graph: ____ Equation: ____
2. Touches at both $x = -3$ and $x = 2$; both ends fall. Graph: ____ Equation: ____
3. Crosses at $x = -3$, touches at $x = 2$; left up/right down. Graph: ____ Equation: ____
4. Touches at $x = -3$, crosses at $x = 2$; left down/right up. Graph: ____ Equation: ____

Explain one match using a zero, multiplicity, and end-behavior statement:
