

Student Workbook

Power & Polynomial Functions

Name: _____

Date: _____

Period: _____

Learning Target: I can identify the degree and leading coefficient of a polynomial and use them to determine end behavior.

Vocabulary

Term	Meaning
Power Function	$f(x) = ax^n$, a single term with a real number exponent n .
Polynomial Function	A sum of power function terms with WHOLE NUMBER exponents.
Degree	The highest exponent in the polynomial.
Leading Coefficient	The coefficient of the term with the highest degree.
End Behavior	What happens to $f(x)$ as x approaches $+\infty$ and $-\infty$.

Key Concept: Identifying Degree & Leading Coefficient

EXAMPLE 1

Identify the degree and leading coefficient of $f(x) = 3x^5 - 2x^3 + 7x - 1$.

Degree: _____ Leading coefficient: _____

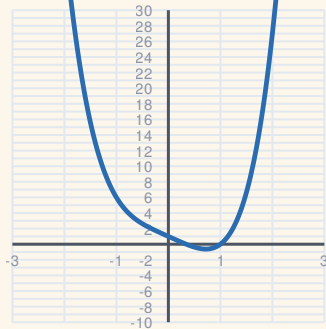
Key Concept: End Behavior

FOUR CASES

Degree	Leading Coeff.	End Behavior
Even	Positive	Both ends point UP
Even	Negative	Both ends point DOWN
Odd	Positive	Left DOWN, Right UP
Odd	Negative	Left UP, Right DOWN

EXAMPLE 2

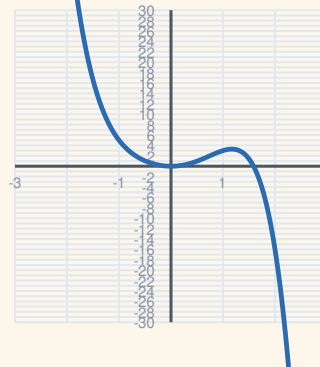
$$f(x) = 2x^4 - 3x + 1 \text{ (even, positive)}$$



Both ends point _____.

EXAMPLE 3

$$f(x) = -x^5 + 4x^2 \text{ (odd, negative)}$$



Left _____, right _____.

COMMON MISTAKE

Only the leading term matters for end behavior! For very large $|x|$, the highest-degree term dominates all the others — don't get distracted by the rest of the polynomial.

Guided Practice — Part A: Identify Degree & Leading Coefficient

A1 $f(x) = 4x^6 - 3x^2 + 1$

A2 $f(x) = -x^3 + 5x - 2$

A3 $f(x) = 2x^2 + 3/x - 1$ (is this a polynomial?)

Guided Practice — Part B: Determine End Behavior

B1 $f(x) = 2x^4 - 3x + 1$

B2 $f(x) = -5x^3 + 2x$

B3 $f(x) = -3x^6 + x^2$

Guided Practice — Part C: From Description to End Behavior

C1 A polynomial has odd degree and positive leading coefficient. Describe its end behavior.

C2 A polynomial has even degree and negative leading coefficient. Describe its end behavior.

Guided Practice — Part D: Write a Possible Polynomial

D1 Degree 4, negative leading coefficient

D2 Degree 5, positive leading coefficient

BEFORE YOU MOVE ON

Check with a partner: does your end behavior match BOTH the parity (even/odd) AND the sign of the leading coefficient?