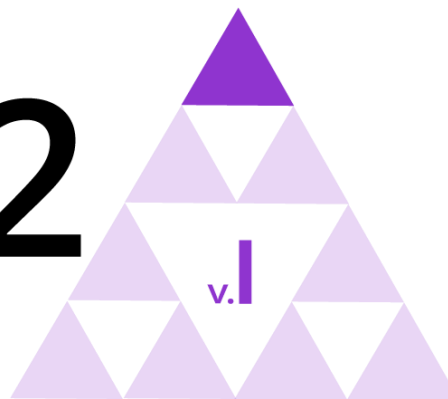


IM 9–12 MATH



Unit 2

Polynomials and Rational Functions

ALGEBRA 2

Lesson 4

Introducing Polynomials

Learning Goal

Let's see what polynomials
can look like.

Algebra 2

What are Polynomials?



Warm-up: Which One Doesn't Belong?

Which one doesn't belong?

A. $4 - x^2 + x^3 - 4x$

A. $2x^4 + x^2 - 5.7x + 2$

A. $x^2 + 7x - x^{\frac{1}{3}} + 2$

A. $x^5 + 8.36x^3 - 2.4x^2 + 0.32x$

Card Sort: Equations and Graphs



Your teacher will give you a set of cards. Group them into pairs that represent the same polynomial function. Be prepared to explain your reasoning.

Let's Make Some Curves



Use graphing technology to write equations for polynomial functions whose graphs have the characteristics listed when plotted on the coordinate plane.

1. A 1st degree polynomial function whose graph intercepts the vertical axis at 8.
2. A 2nd degree polynomial function whose graph has only positive y -values.
3. A 2nd degree polynomial function whose graph contains the point $(0, -9)$.
4. A 3rd degree polynomial function whose graph crosses the horizontal axis more than once.
5. A 4th degree or higher polynomial function whose graph never crosses the horizontal axis.



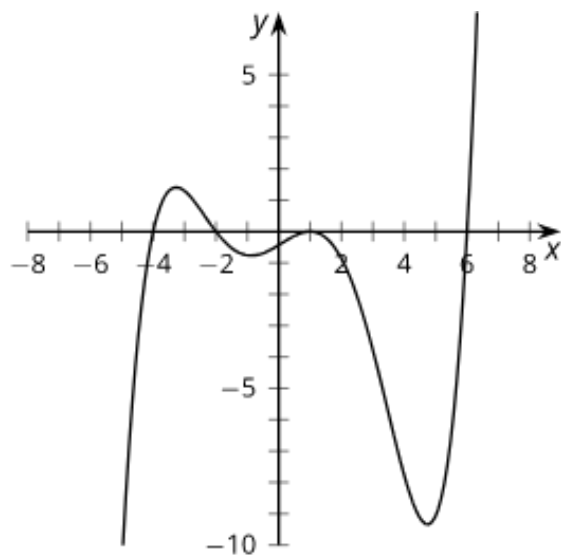
- Could the graph of a polynomial have a loop?
- How many terms could an expression for a polynomial have?
- Does π count as a polynomial? What degree would it have?

I can identify important characteristics of polynomial graphs and expressions.

Learning Targets

Algebra 2

1. Write an equation for a polynomial with all the following features:
 - a. The degree is 5.
 - b. The polynomial has 4 terms.
 - c. The graph of the polynomial crosses the vertical axis at $y = 12$.
2. Identify the approximate input values of any relative maximums and minimums of this 5th degree polynomial.





degree

The degree of a polynomial in x is the highest exponent occurring on x when you write the polynomial out as a sum of non-zero constants times powers of x (with like terms collected).



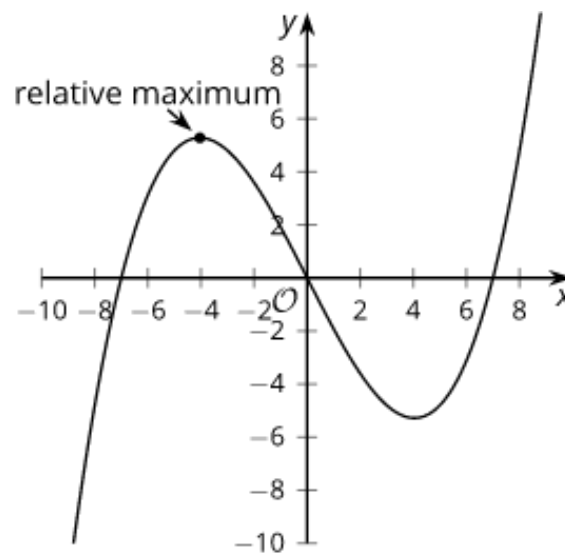
polynomial

A polynomial function of x is a function given by a sum of terms, each of which is a constant times a whole number power of x . The word polynomial is used to refer both to the function and to the expression defining it.



relative maximum

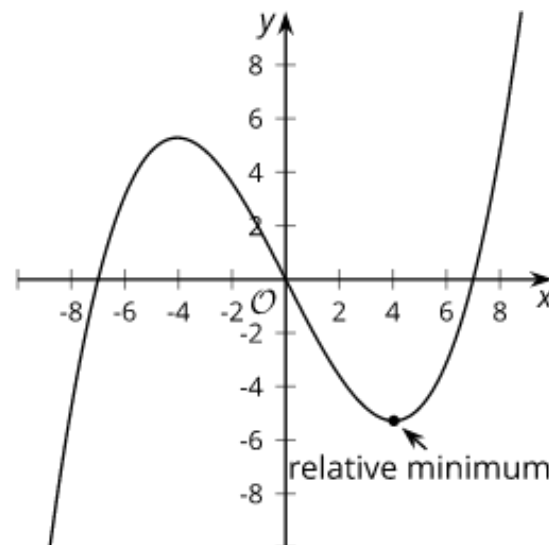
A point on the graph of a function that is higher than any of the points around it.





relative minimum

A point on the graph of a function that is lower than any of the points around it.





This slide deck is copyright 2020 by Kendall Hunt Publishing, <https://im.kendallhunt.com/>, and is licensed under the Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0), <https://creativecommons.org/licenses/by-nc/4.0/>. This slide deck is copyright 2020 by Kendall Hunt Publishing, <https://im.kendallhunt.com/>, and is licensed under the Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0), <https://creativecommons.org/licenses/by-nc/4.0/>.

All curriculum excerpts are under the following licenses:

IM 9–12 Math is copyright 2019 by Illustrative Mathematics. It is licensed under the Creative Commons Attribution 4.0 International License (CC BY 4.0).

This material includes public domain images or openly licensed images that are copyrighted by their respective owners. Openly licensed images remain under the terms of their respective licenses. See the image attribution section for more information.

The Illustrative Mathematics name and logo are not subject to the Creative Commons license and may not be used without the prior and express written consent of Illustrative Mathematics.