

Your Name

Mrs. Theo

415122

Notes

2-3, 3-1 and 3-5

End Behavior and Intercepts of Polynomial Functions

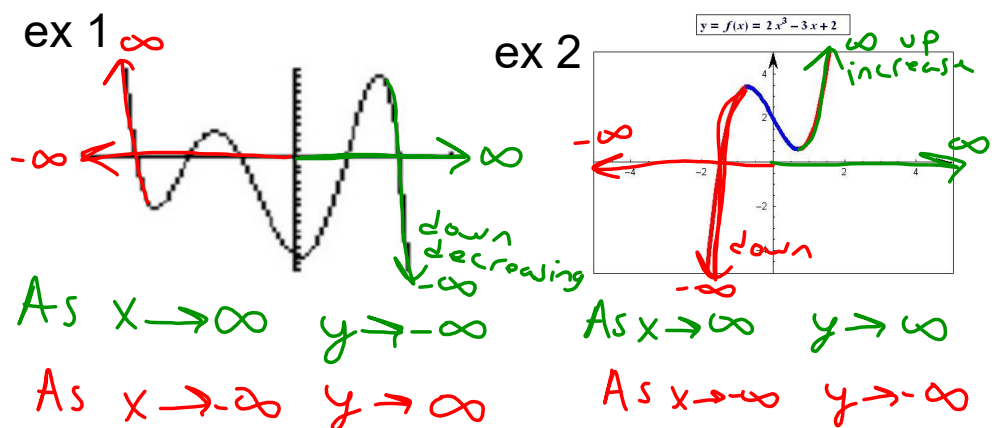
End behavior

What happens towards the ends of the function

As x approaches ∞ , where are the y values headed?

As $x \rightarrow \infty$ $y \rightarrow ?$

As $x \rightarrow -\infty$ $y \rightarrow ?$

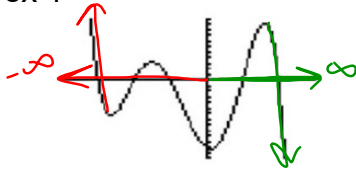


Another way to write it...

The y values are going where, as x approaches ∞ ?

$$\begin{aligned} f(x) &\rightarrow ? & \text{As } x &\rightarrow \infty \\ f(x) &\rightarrow ? & \text{As } x &\rightarrow -\infty \end{aligned}$$

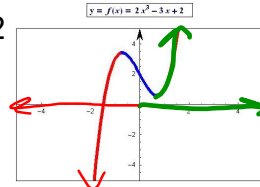
ex 1



$$f(x) \rightarrow -\infty \text{ As } x \rightarrow \infty$$

$$f(x) \rightarrow \infty \text{ As } x \rightarrow -\infty$$

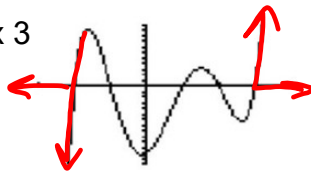
ex 2



$$f(x) \rightarrow \infty \text{ As } x \rightarrow \infty$$

$$f(x) \rightarrow -\infty \text{ As } x \rightarrow -\infty$$

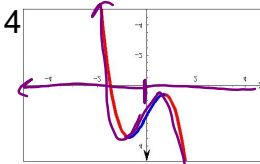
ex 3



$$f(x) \rightarrow \infty \text{ As } x \rightarrow \infty$$

$$f(x) \rightarrow -\infty \text{ As } x \rightarrow -\infty$$

ex 4



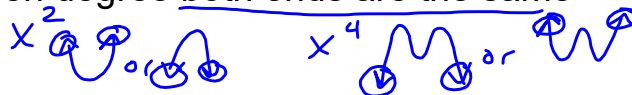
$$f(x) \rightarrow -\infty \text{ As } x \rightarrow \infty$$

$$f(x) \rightarrow \infty \text{ As } x \rightarrow -\infty$$

Degree of a function: the highest exponent in standard form

determines solutions and end behavior

Even degree both ends are the same



Odd Degree opposite



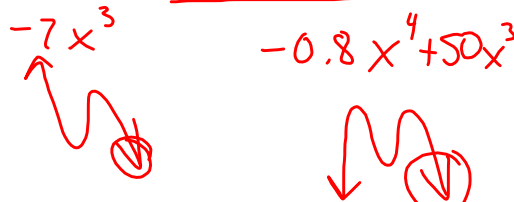
Lead Coefficient of a function:

determines right side of end behavior

Positive - right side up



Negative - right side down



Sketching
Graphs

End Behavior of Polynomials

Diagram illustrating the end behavior of polynomials based on the leading coefficient (a_n) and the degree (odd or even).

Polynomials shown:

- $-40x + 2$ (Degree 1, odd)
- $0.3x^3 - 2$ (Degree 3, odd)
- $-8x^3 + 7x^2 + 3x + 7$ (Degree 3, odd)
- $3x^5 - 2x^2 + 40x^4 - x + 100$ (Degree 5, odd)
- $-4x^{10} + x + 2$ (Degree 10, even)
- $3x - 2x^6 + 40x^3 - 1 + 100x$ (Degree 6, even)
- $4x^{20} - 3x^5$ (Degree 20, even)

Each polynomial is associated with a diagram showing the leading coefficient (a_n), the degree (odd or even), and the resulting end behavior as $x \rightarrow \infty$ and $x \rightarrow -\infty$.

Sketching
Graphs

End Behavior of Polynomials

Diagram illustrating the end behavior of polynomials based on the leading coefficient (a_n) and the degree (odd or even), with handwritten annotations.

Polynomials shown with annotations:

- $-40x + 2x^0$ (Degree 1, odd) - *Handwritten: 1, opposite*
- $0.3x^3 - 2$ (Degree 3, odd) - *Handwritten: 3, opposite*
- $-8x^3 + 7x^2 + 3x + 7$ (Degree 3, odd) - *Handwritten: 3, opposite*
- $3x^5 - 2x^2 + 40x^4 - x + 100$ (Degree 5, odd) - *Handwritten: 5, opposite*
- $-4x^{10} + x + 2$ (Degree 10, even) - *Handwritten: 10, same*
- $3x - 2x^6 + 40x^3 - 1 + 100x$ (Degree 6, even) - *Handwritten: 6, same as right; l.c. determines side*
- $4x^{20} - 3x^5$ (Degree 20, even) - *Handwritten: 20, same*

Handwritten notes include "opposite" and "same as right" indicating the direction of the end behavior relative to the leading coefficient and degree.