

10.3 More on Limits

Target 9A: Evaluate a limit of a function algebraically

Target 9C: Evaluate a limit of a function graphically

Review of Prior Concepts

HINT: Think about the parent functions

1. $\lim_{x \rightarrow \infty} (x^2 + 3x - 2)$

2. $\lim_{x \rightarrow -\infty} (x^2 + 3x - 2)$

3. $\lim_{x \rightarrow \infty} (x^3 + 2)$

4. $\lim_{x \rightarrow -\infty} (x^3 + 2)$

5. $\lim_{x \rightarrow \infty} (e^x)$

6. $\lim_{x \rightarrow -\infty} (e^x)$

More Practice

End Behavior

<http://www.coolmath.com/precalculus-review-calculus-intro/precalculus-algebra/14-tail-behavior-limits-at-infinity-02><https://quizlet.com/48500929/end-behavior-of-12-basic-functions-flash-cards/><http://www.mathguide.com/cgi-bin/quizmasters3/EB.cgi>https://youtu.be/Krjd_vU4Uvg

Limits at Infinity

(end behavior of a graph/function)

Example 1:

a) Find $\lim_{x \rightarrow \infty} \left(\frac{3}{x}\right)$

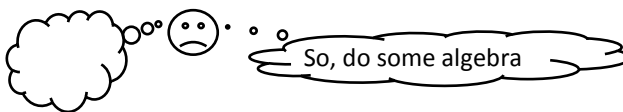
As x approaches ∞ , the graph of $\frac{3}{x}$ approaches 0.


b) Find $\lim_{x \rightarrow -\infty} \left(\frac{3}{x}\right)$

As x approaches _____, the graph of $\frac{3}{x}$ approaches _____

.....
Example 2:

a) Find $\lim_{x \rightarrow \infty} \left(\frac{x-2}{3x-4} \right)$



 Check answer graphically (graph the function & the answer)

b) Find $\lim_{x \rightarrow -\infty} \left(\frac{6x}{3x+4} \right)$

c) Find $\lim_{x \rightarrow \infty} \left(\frac{8x-1}{2x+3} \right)$

(Can you see the answer quickly—w/o work?)

Conclusion:

If degree of Numerator degree of Denominator, then $\lim_{x \rightarrow \infty} f(x) =$

(and, Horizontal Asymptote @ $y =$)

.....
Example 3:

a) Find $\lim_{x \rightarrow \infty} \left(\frac{x-2}{3x^2-4} \right)$



b) Find $\lim_{x \rightarrow -\infty} \left(\frac{6x}{3x^2+4} \right)$

Conclusion:

If degree of Numerator degree of Denominator, then $\lim_{x \rightarrow \infty} f(x) =$

(and, Horizontal Asymptote @ $y =$

.....
Example 4:

a) Find $\lim_{x \rightarrow \infty} \left(\frac{x^2 - 2}{3x - 4} \right)$



b) Find $\lim_{x \rightarrow -\infty} \left(\frac{6x^2}{3x + 4} \right)$

Conclusion:

If degree of Numerator < degree of Denominator, then $\lim_{x \rightarrow \infty} f(x) =$

(and, NO Horizontal Asymptote)

More Practice

Limits at Infinity

<https://www.mathsisfun.com/calculus/limits-infinity.html>

<https://www.khanacademy.org/math/ap-calculus-ab/infinite-limits-ab/limits-at-infinity-ab/v/limits-and-infinity>

<http://www.shmoop.com/precalculus-limits/limits-infinity.html>

<https://youtu.be/wBYr-58mc5E>

<https://youtu.be/75xO9xy7TTQ>

<https://youtu.be/FVJNuukADeQ>

Homework Assignment

Worksheet