Topics

In this document we will review

- Simplifying and solving absolute value expressions and equations
- Graphing absolute value inequalities
- Solving absolute value inequalities

Why do we need this?

Examples are listed below from several different sections and chapters.

Example 1 (From Section 1.6)**.** Evaluate the limit $\lim_{x\to 3^-} 2|x-3|+5$

Example 2 (From Section 3.3)**.** Find the domain and range of $f(x) = |x+5| - 4$

Example 3 (From Section 1.7)**.** Find the largest value of $\delta > 0$ in the formal definition of a limit which ensures $\lim_{x\to 1}[2x+1] = 3$.

Important Definitions and Theorems

Definition 4. $|x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$

Theorem 5. If $|A| = k$ then $A = k$ or $A = -k$.

Theorem 6. $|AB| = |A||B|$

Theorem 7. If $|A| < k$ then $-k < A < k$

Theorem 8. If $k \geq 0$ then $|x-a| < k$ is equivalent to the geometric statement "x is less than distance k from a".

Instructional Videos

Click on the following links to access helpful instructional videos:

- Absolute values as distance
  `www.math.msu.edu/classes/mth_132/review_video/abs1.aspx`
- Graphing Absolute Value Functions
  `www.math.msu.edu/classes/mth_132/review_video/abs2.aspx`
- Solving Absolute Value Inequalities
  `www.math.msu.edu/classes/mth_132/review_video/abs3.aspx`

Now that you have been exposed to all the ideas and seen a couple solutions worked out you should try a few problems. Please see the quiz which has some questions for you to try and the answers posted at the end. The important thing is the work that leads to the answers. That's where you come in!