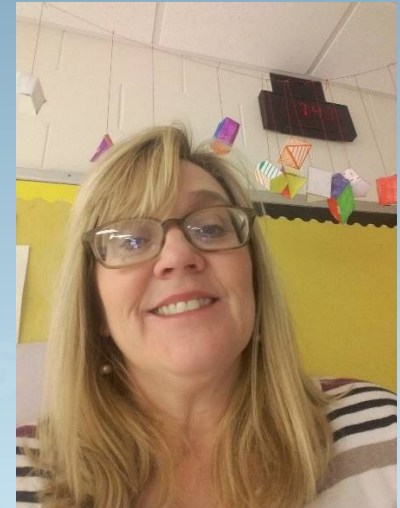# Explore Absolute Value

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NCTM | NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS

The Vision of the CRC

Create an online mathematics education professional learning community that is the go-to site for teachers.

ARCs

- Activities with Rigor and Coherence
- Sequence of 2–4 lessons that…
  - support Principles to Actions
  - addresses a specific math topic
  - scaffolds effective teaching
  - supports the 8 SMPs
  - demonstrates the 5 Practices for Orchestrating Productive Mathematics Discussions
  - integrates the wide array of NCTM resources

ARC Topics

- Illumination activities
  - Law of Sines and Cosines
  - Coding and Decoding
- New topics
  - Absolute Value
  - Triangle Congruence via Transformations
  - Barbie Bungee - Regressions
  - Graphing Trigonometric Functions
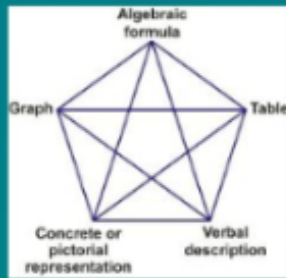 - Ferris Wheel: Graphs of Sine and Cosine Functions

Absolute Value

- What do you think of when you hear absolute value
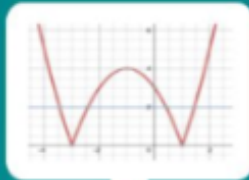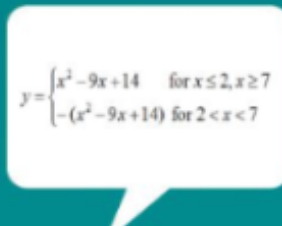
What does absolute value mean?

Absolute Value on the Number Line

Double Number Line

What could the function be? Make a prediction.

f(x)=

f(-3)=

Absolute Value on the Coordinate Plane

- What is the relationship between a function and its' absolute value?

- What do you notice? What do you wonder?

- Graph by hand, TI calculators, Desmos, a combination of those, etc.

Absolute Value on the Coordinate Plane

- What were some of the functions you chose for problems 7 & 8?

- Rewrite each absolute value function as a piecewise defined function.
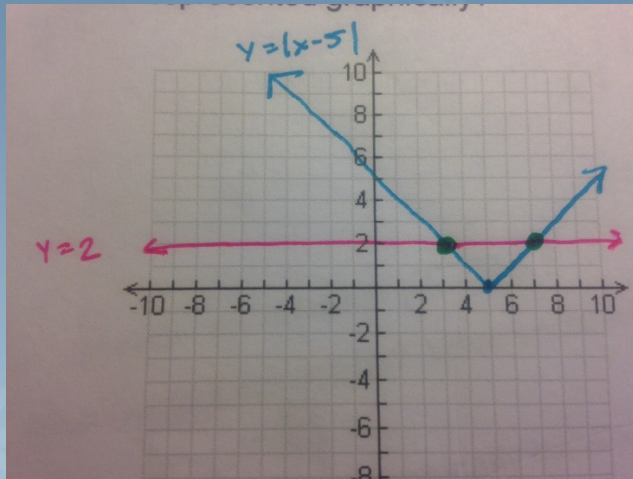
- Desmos

Absolute Value on the Coordinate Plane

- How does reflection help us understand the graph of linear and non-linear absolute value functions? What type of assessment might address this question?

Solving Absolute Value Equations

- How is a solution to a system of equations represented graphically.

Solving Absolute Value Equations

$y = |x-5|$

$y = 2$

Solution(s): 3, 7

Solve the equation algebraically by rewriting the absolute value function as a piecewise function.

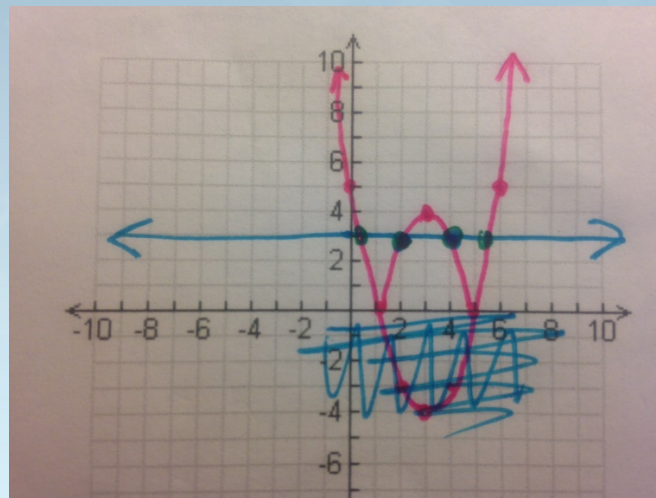$$Y_1 = \begin{cases} x-5 & x \geq 5 \\ -(x-5) & x < 5 \end{cases}$$

$x - 5 = 2$
$x = 7$

$-(x-5) = 2$
$x - 5 = -2$
$x = 3$

= 3

Solution(s): 4, 2, $3 \pm \sqrt{7}$

Solve the equation algebraically by rewriting the absolute value function as a piecewise function.

$$Y_1 = \begin{cases} (x-3)^2 - 4 & x \geq 5, \; x \leq 1 \\ -(x-3)^2 + 4 & 1 \leq x \leq 5 \end{cases}$$

$(x-3)^2 - 4 = 3$
$(x-3)^2 = 7$
$x - 3 = \pm\sqrt{7}$
$x = 3 \pm \sqrt{7}$

$-(x-3)^2 + 4 = 3$
$-(x-3)^2 = -1$
$(x-3)^2 = 1$
$x - 3 = 1 \quad x - 3 = -1$
$x = 4 \quad x = 2$

Solving Absolute Value Equations

WANT MORE?

- Session 194: Explore Absolute Value & Contribute to the Development of NCTM's ARCs (8-10)

- Session 220: Explore Real-World Statistics, Simulate a Bungee Jump & Meet NCTM's ARCs. (10-12)

- Session 276: Explore Growing Patterns & Engage with Manipulatives with NCTM's ARCs (3-5)

- Session 336: Explore Area Concepts & Contribute to the Development of NCTM's ARCs (6-8)

- Session 591: Explore Counting Strategies with NCTM's Activities with Rigor & Coherence (Pk-2)

See: www.nctm.org/ARCs/

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Get Involved!

Add your comments!

•modifications

•general thoughts

•opportunities for differentiation

•reflection after implementation

Contribute...

•future ARCs

•great projects that have worked for you

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http://www.nctm.org/ARCs/