AURORA UNIVERSITY

Engagement Team

2026 Virtual Teaching Hackathon

Team Names, Titles, Roles

- Alexander Vargas, Kenyon Woods Middle School – Contributor
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- Cassie Winchell, West Aurora High School – Writer
- Marisa Janecek, Indian Creek High School – Writer
- Brigid Redmond-Mattucci, Yorkville High School – Reporter
- Dr. Lindsey Hill, Aurora University Faculty – Team Leader

Problem Selection

Key Problem

Students don’t possess “simple” prerequisite skills or knowledge, or they don’t realize what they do possess.

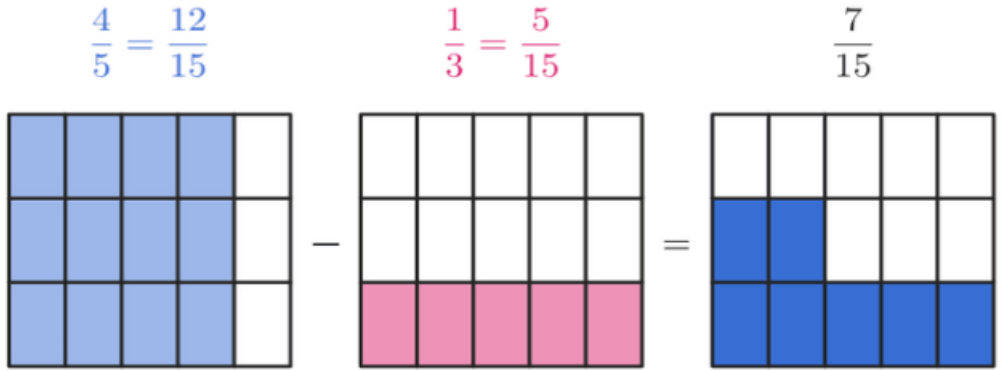
Visual Resources

Basic Arithmetic

- Resources on Khan Academy
  - Rounding and place value
  - Fractions
  - Decimals

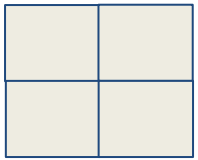
Fractions

- Fraction Sense on GeoGebra
- Operations with Fractions on GeoGebra
- Virge Cornelius' Mathematical Circuit Training (free)

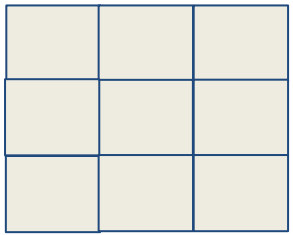


Square Roots

$\sqrt{4}=2$ The square root of 4 is 2. Meaning: If you have a square with area 4, its sides have length 2.



$\sqrt{9} = 3$ The square root of 9 is 3. Meaning: If you have a square with area 9, its sides have length 3.

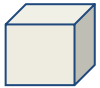


Posters about perfect squares and cubes on Math Equals Love (free)

Cube Roots

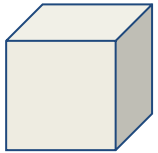
$\sqrt[3]{1}= 1$ A cube with volume 1 has sides of length 1.

Corresponding fact: 1^3= 1



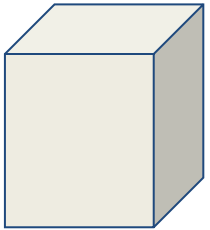
$\sqrt[3]{8}=2$ A cube with volume 8 has sides of length 2.

Corresponding fact: 2^3=2*2*2=8



$\sqrt[3]{27}=3$ A cube with volume 27 has sides of length 3.

Corresponding fact: 3^3=3*3*3=27



Posters about perfect squares and cubes on Math Equals Love (free).

Invisible Math

- Interchangeable multiplication symbols: a*b, a(b), a x b, ab
- Interchangeable division symbols: a/b, a ÷ b, b⟌a
- Every number can be written as a fraction with a denominator of 1: 3=3/1
- There is a decimal point at the end of every whole number: 9=9.0
- There is a multiplication sign between every coefficient and variable: 5y=5*y
- There is a coefficient of 1 to the left of every variable: x=1x
- A negative sign to the left of a variable is negative one times the variable: -x=(-1)x.
- There is a positive sign to the left of every number: 8= +8

Invisible Math in the Classroom

Guided inquiry: What is a^0 ?

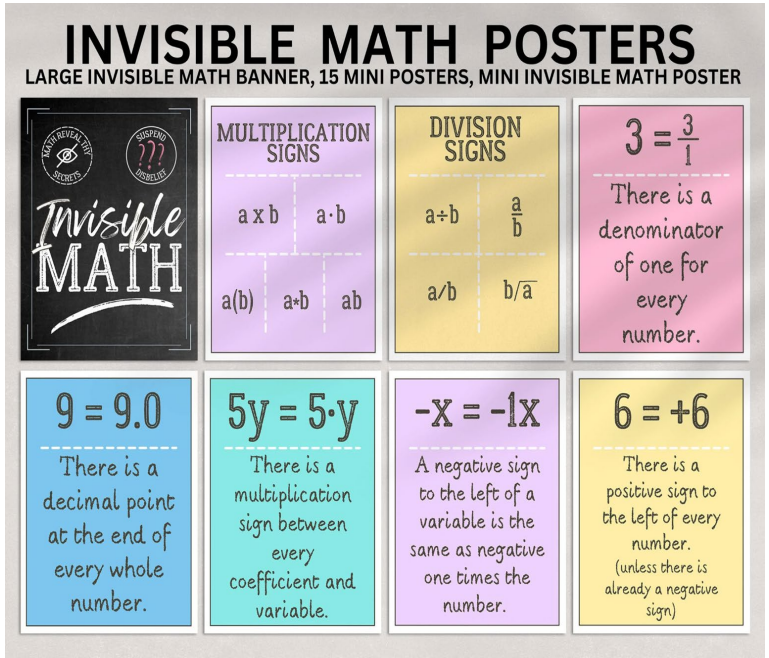
For students who know the product rule for exponents:

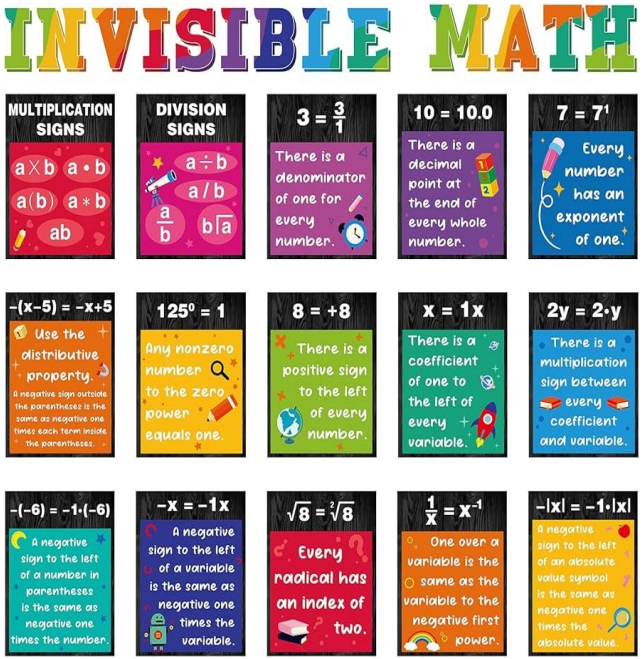
1. Calculate 2^{5+0} in two ways.
   a. Add the exponents first.
   b. Use the product rule for exponents first.
   c. Set the two expressions equal to each other. What does 2^0 have to be?

For students who know the quotient rule for exponents:

1. Calculate $7^2 / 7^2$ in two ways.
   a. Compute the numerator and denominator. Then divide.
   b. Use the quotient rule for exponents first.
   c. Set the two expressions equal to each other. What can we conclude?

Posters for Invisible Math





Activities and Other Strategies

The Four 4's

The Four 4's on YouCubed challenges students to write every number from 1 to 20 with exactly four 4's and any operations. This helps students review fundamentals (PEMDAS, operations, etc.) in a challenging but approachable way.

Ex: 4+4+4+4=16

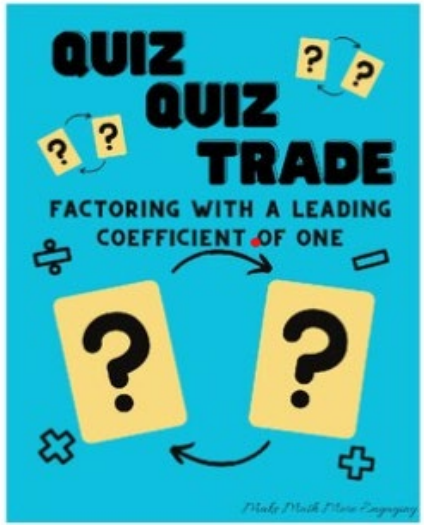
(4/4)*(4/4)=1

4-4+sqrt(4)+4=6

Quiz, Quiz, Trade

Quiz, Quiz, Trade promotes peer-to-peer teaching, which increases student retention.

1. Each student receives an outline question card.
2. Students pair up and quiz each other.
3. After answering, they trade cards and find a new partner.
4. Continue for 10-15 minutes.



Other Strategies

Stations

1. Create stations in the classroom with more seats than students.
2. Add a sheet to each station with a question on the front of the paper and answers on the back.
3. Assign students to stations randomly and allow them to move around, working on the questions independently and together.

Assign students or groups to questions on a quiz or test review and share their work as an answer key and/or learning opportunity.

When students ask questions they may subconsciously know the answer to, probe with more questions (e.g., What have you tried? What questions have you discussed with your group?).