Petersburg Mathematics Cohort

Day 2

Copyright 2022 Sarah R. Powell, Ph.D.

Sarah R. Powell, Ph.D.

Associate Professor
The University of Texas at Austin

www.sarahpowellphd.com

srpowell@utexas.edu

@sarahpowellphd

Copyright 2022 Sarah R. Powell, Ph.D.

Introduce yourself.
Describe your role as an educator.
Describe the mathematics you support.

Share your Twitter handle!

Copyright 2022 Sarah R. Powell, Ph.D.

Schedule for Today

GRADES K-5

9:00-9:05	- Trajectories in mathematics
9:05-9:45	- Manipulatives: Early Numeracy
9:45-10:30	- Manipulatives: Whole Numbers and Place Value
10:30-10:40	BREAK
10:40-11:45	- Manipulatives: Fractions
11:45-12:00	- Wrap-up

GRADES 6-12

1:00-1:05	- Trajectories in mathematics
1:05-1:40	- Manipulatives: Fraction Concepts
1:40-2:20	- Manipulatives: Fraction Computation
2:20-2:30	BREAK
2:30-2:45	- Manipulatives: Decimals
2:45-3:45	- Manipulatives: Algebra
3:45-4:00	- Wrap-up

Copyright 2022 Sarah R. Powell, Ph.D.

Trajectories in Mathematics

Copyright 2022 Sarah R. Powell, Ph.D.

An important subset of the major work in grades K–8 is the progression that leads toward middle school algebra.

K	1	2	3	4	5	6	7	8
Know number names and the count sequence Count to tell the number of objects Compare numbers Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from Work with numbers 11-19 to gain foundations for place value	Represent and solve problems involving addition and subtraction Understand and apply properties of operations and the relationship between addition and subtraction Add and subtract within 20 Work with addition and subtraction equations Extend the counting sequence Understand place value Use place value understanding and properties of operations to add and subtract Measure lengths indirectly and by iterating length units	Represent and solve problems involving addition and subtraction Add and subtract within 20 Understand place value Use place value understanding and properties of operations to add and subtract Measure and estimate lengths in standard units Relate addition and subtraction to length	Represent & solve problems involving multiplication and division Understand properties of multiplication and the relationship between multiplication and division Multiply & divide within 100 Solve problems involving the four operations, and identify & explain patterns in arithmetic Develop understanding of fractions as numbers Solve problems involving measurement and estimation of intervals of time, liquid volumes, & masses of objects Geometric measurement: understand concepts of area and relate area to multiplication and to addition	Use the four operations with whole numbers to solve problems Generalize place value understanding for multi-digit whole numbers Use place value understanding and properties of operations to perform multidigit arithmetic Extend understanding of fraction equivalence and ordering Build fractions from unit fractions by applying and extending previous understandings of operations Understand decimal notation for fractions, and compare decimal fractions	Understand the place value system Perform operations with multi-digit whole numbers and decimals to hundredths Use equivalent fractions as a strategy to add and subtract fractions Apply and extend previous understandings of multiplication and division to multiply and divide fractions Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition Graph points in the coordinate plane to solve real-world and mathematical problems*	Apply and extend previous understandings of multiplication and division to divide fractions by fractions Apply and extend previous understandings of numbers to the system of rational numbers Understand ratio concepts and use ratio reasoning to solve problems Apply and extend previous understandings of arithmetic to algebraic expressions Reason about and solve one-variable equations and inequalities Represent and analyze quantitative relationships between dependent and independent variables	Apply and extend previous understanding of operations with fractions to add, subtract, multiply, and divide rational numbers Analyze proportional relationships and use them to solve real-world and mathematical problems Use properties of operations to generate equivalent expressions Solve real-life and mathematical problems using numerical and algebraic expressions and equations	Work with radical and integer exponents Understand the connections between proportional relationships, lines, and linear equations** Analyze and solve linear equations and pairs of simultaneous linear equations Define, evaluate, and compare functions Use functions to model relationships between quantities

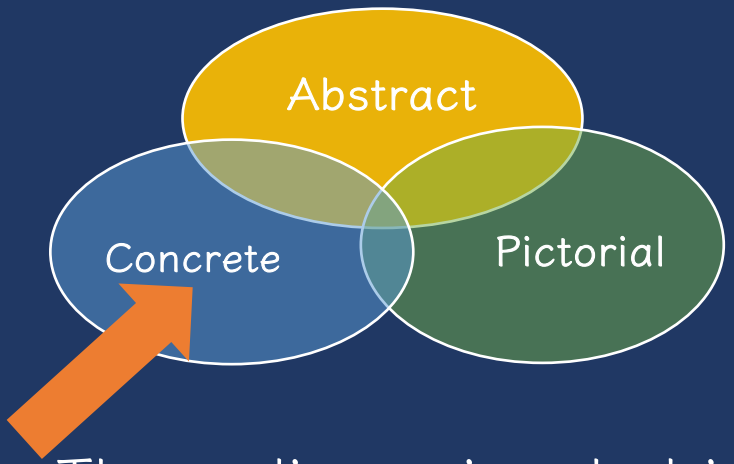
* Indicates a cluster that is well thought of as a part of a student's progress to algebra, but that is currently not designated as major by the assessment consortia in their draft materials. Apart from the one asterisked exception, the clusters listed here are a subset of those designated as major in the assessment consortia's draft documents.
** Depends on similarity ideas from geometry to show that slope can be defined and then used to show that a linear equation has a graph which is a straight line and conversely.

https://achievethecore.org/category/774/mathematics-focus-by-grade-level

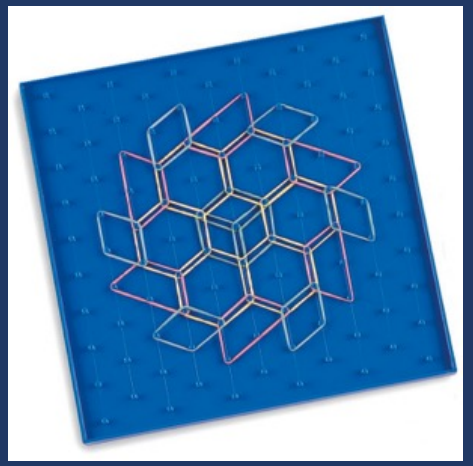
Copyright 2022 Sarah R. Powell, Ph.D.

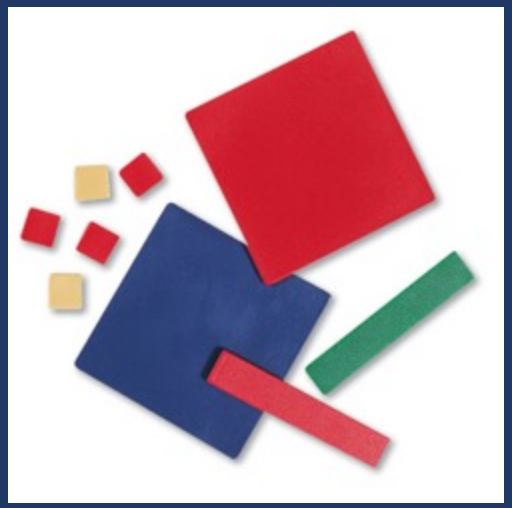
What's the critical math content for your students?

Copyright 2022 Sarah R. Powell, Ph.D.

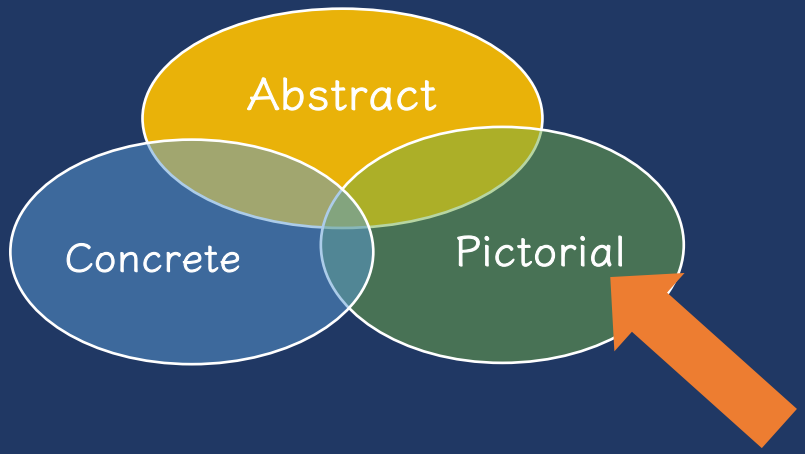


Three-dimensional objects

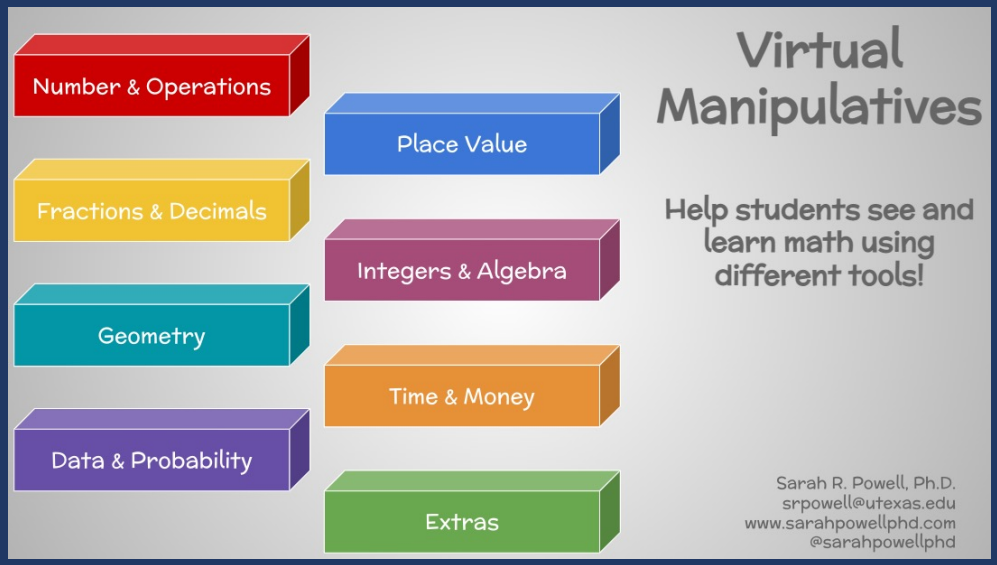




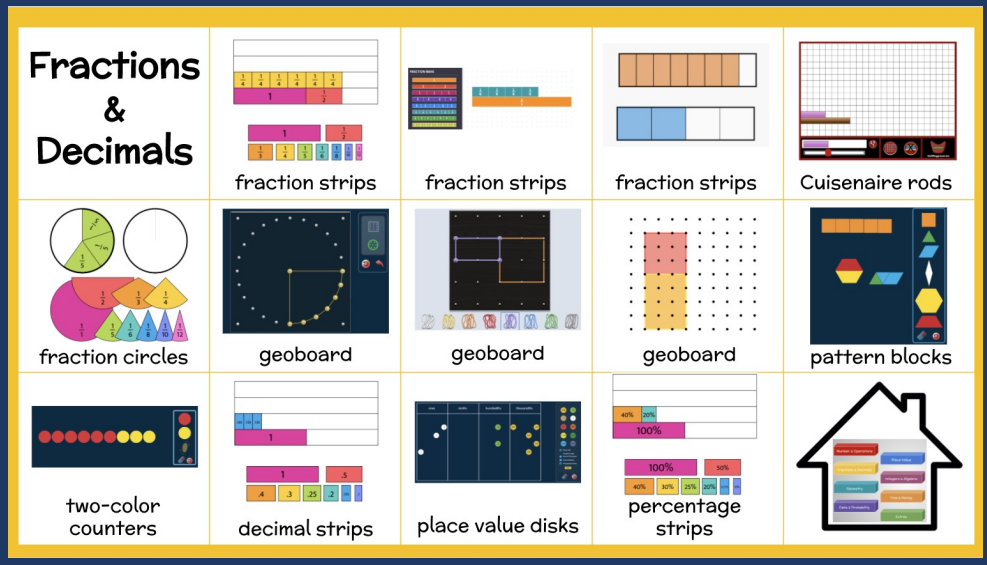
Copyright 2022 Sarah R. Powell, Ph.D.



Two-dimensional images



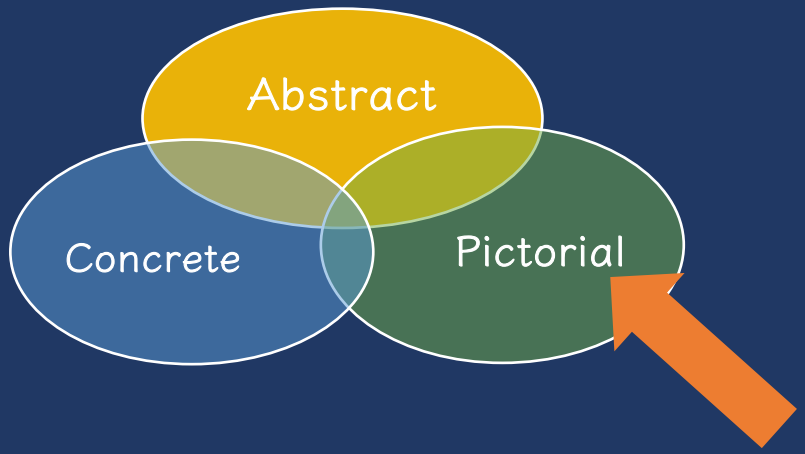
https://bit.ly/srpowell



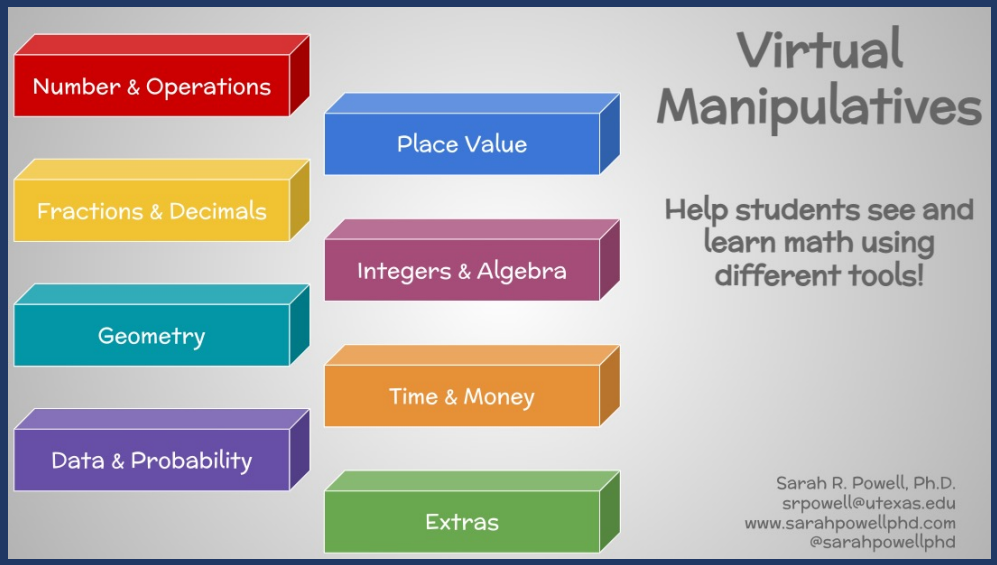
Copyright 2022 Sarah R. Powell, Ph.D.

Manipulatives: Fraction Concepts

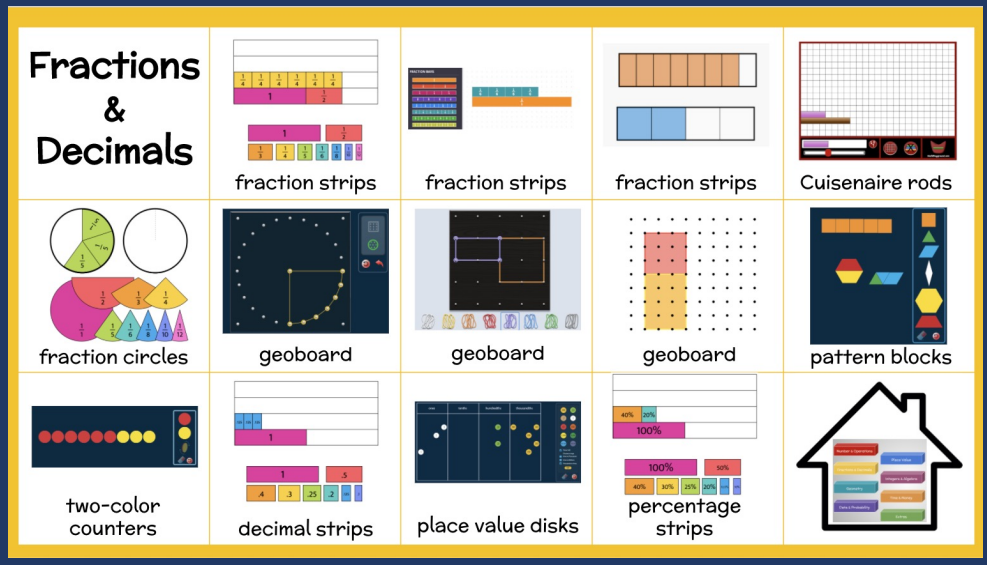
Copyright 2022 Sarah R. Powell, Ph.D.



Two-dimensional images



https://bit.ly/srpowell

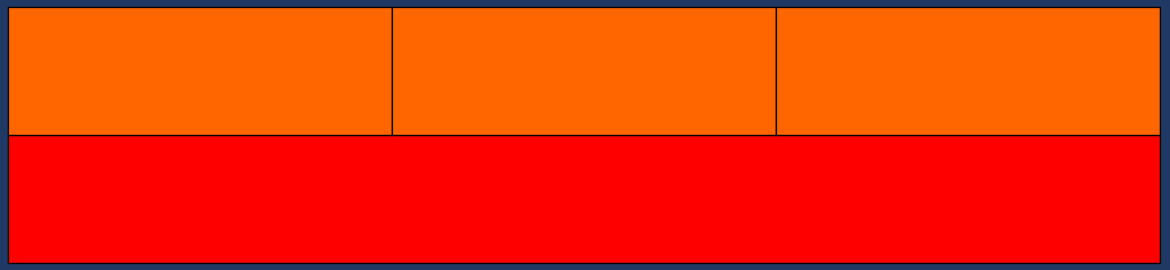


Copyright 2022 Sarah R. Powell, Ph.D.

Length/Measurement

Fractions are appropriated by length

$\frac{2}{3}$



Fraction tiles/ba

Copyright 2022 Sarah R. Powell, Ph.D.

Length/Measurement

Fractions are appropriated by length

$\frac{2}{3}$

Cuisenaire rods

Copyright 2022 Sarah R. Powell, Ph.D.

Length/Measurement

Fractions are appropriated by length

$\frac{2}{3}$

Number line

Copyright 2022 Sarah R. Powell, Ph.D.

Fraction Concepts

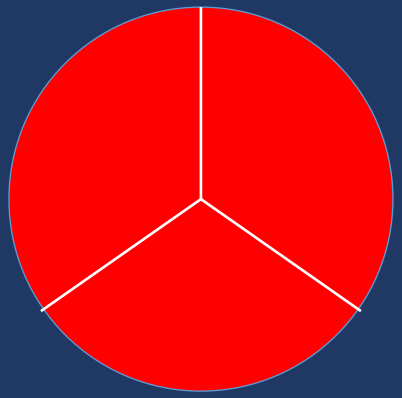
Fraction	Length	Area	Set
$\frac{2}{3}$			
$\frac{1}{4}$			
$1\frac{1}{2}$			
$\frac{3}{7}$			

Copyright 2022 Sarah R. Powell, Ph.D.

Area/Region

Shapes divided into *equal* sections

$\frac{2}{3}$



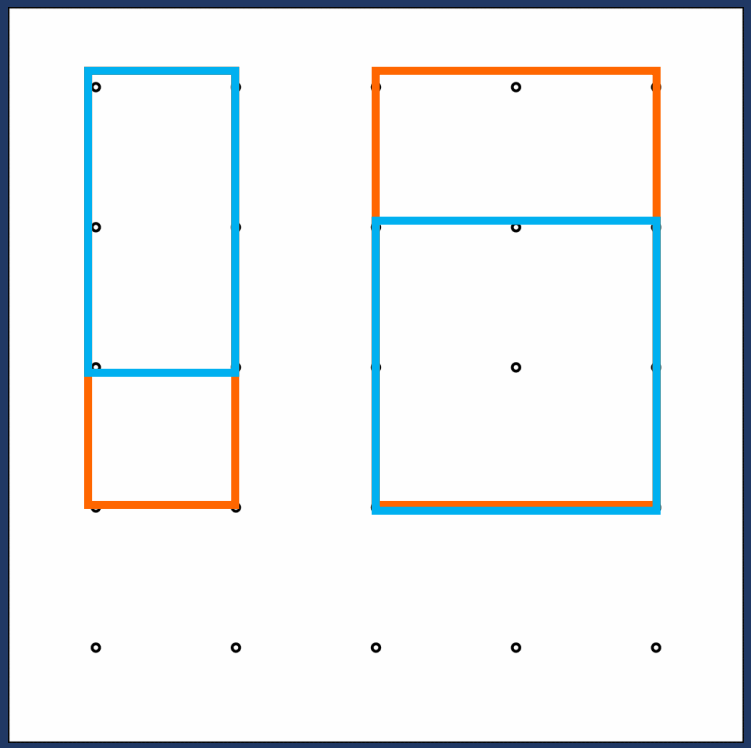
Fraction circles

Copyright 2022 Sarah R. Powell, Ph.D.

Area/Region

Shapes divided into *equal* sections

$\frac{2}{3}$



Geoboards

Copyright 2022 Sarah R. Powell, Ph.D.

Area/Region

Shapes divided into equal sections

$\frac{2}{3}$

Pattern blocks

Copyright 2022 Sarah R. Powell, Ph.D.

Area/Region

Shapes divided into equal sections

$\frac{2}{3}$

Legos

Copyright 2022 Sarah R. Powell, Ph.D.

Fraction Concepts

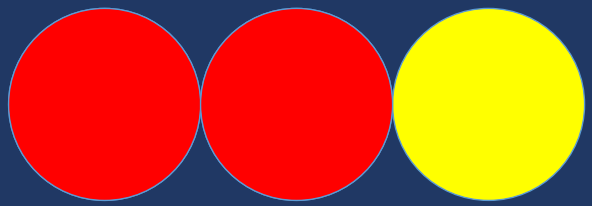
Fraction	Length	Area	Set
$\frac{2}{3}$			
$\frac{1}{4}$			
$1\frac{1}{2}$			
$\frac{3}{7}$			

Copyright 2022 Sarah R. Powell, Ph.D.

Set/Discrete

Individual shapes match the fraction

$\frac{2}{3}$



Two-color counters

Copyright 2022 Sarah R. Powell, Ph.D.

Set/Discrete

Individual shapes match the fraction

$\frac{2}{3}$

Copyright 2022 Sarah R. Powell, Ph.D.

Fraction Concepts

Fraction	Length	Area	Set
$\frac{2}{3}$			
$\frac{1}{4}$			
$1\frac{1}{2}$			
$\frac{3}{7}$			

Copyright 2022 Sarah R. Powell, Ph.D.

Improper Fractions and Mixed Numbers

Equivalent Fractions

$\frac{1}{2}$ $\frac{1}{4}$

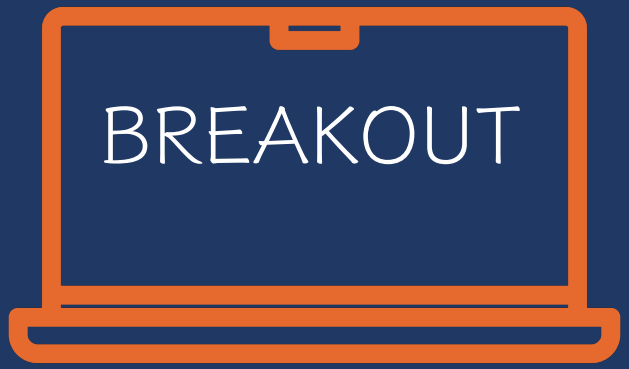
Comparing Fractions

$\frac{1}{2}$ $\frac{3}{10}$ $\frac{2}{6}$ $\frac{4}{6}$ $\frac{2}{3}$ $\frac{2}{5}$

Ordering Fractions

$\frac{6}{8}$ $\frac{3}{5}$ $\frac{1}{3}$

Copyright 2022 Sarah R. Powell, Ph.D.

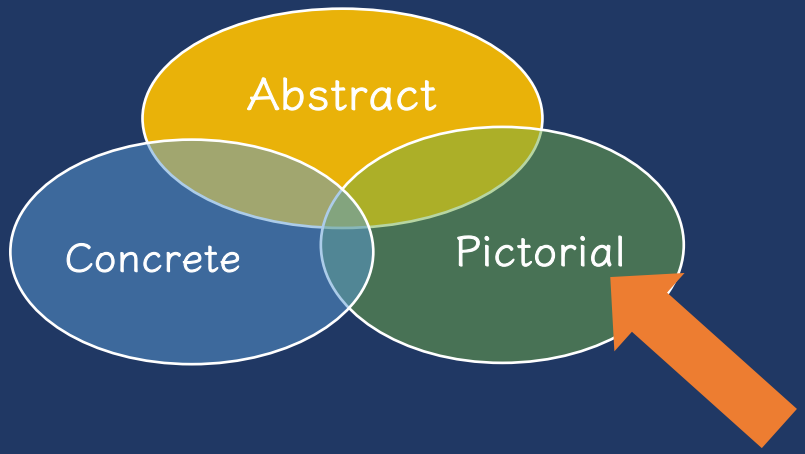


1. Share some of your favorite hands-on materials for fractions.
2. Share some of your favorite virtual manipulatives for fractions.
3. Considerations for using these tools with students?

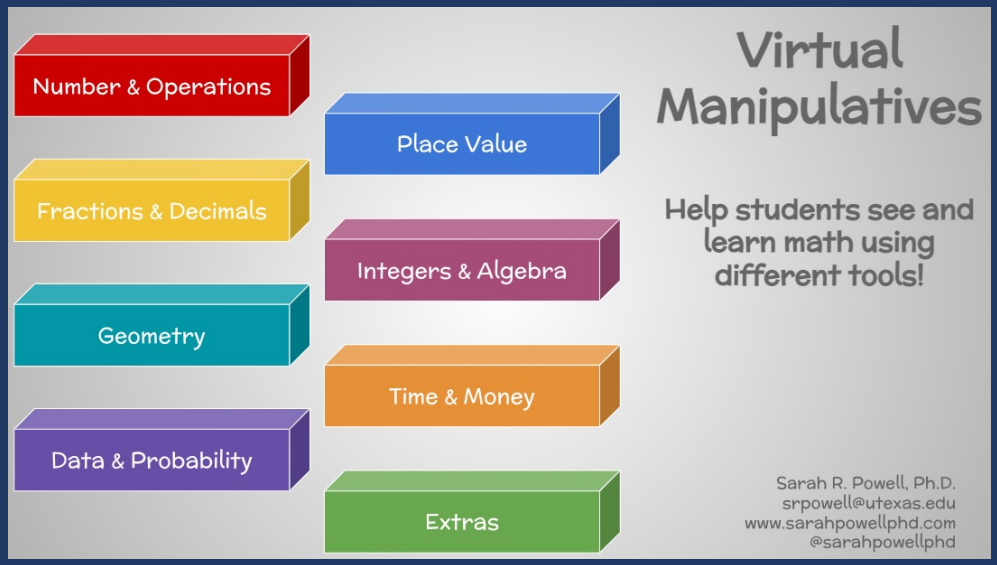
Copyright 2022 Sarah R. Powell, Ph.D.

Manipulatives: Fraction Computation

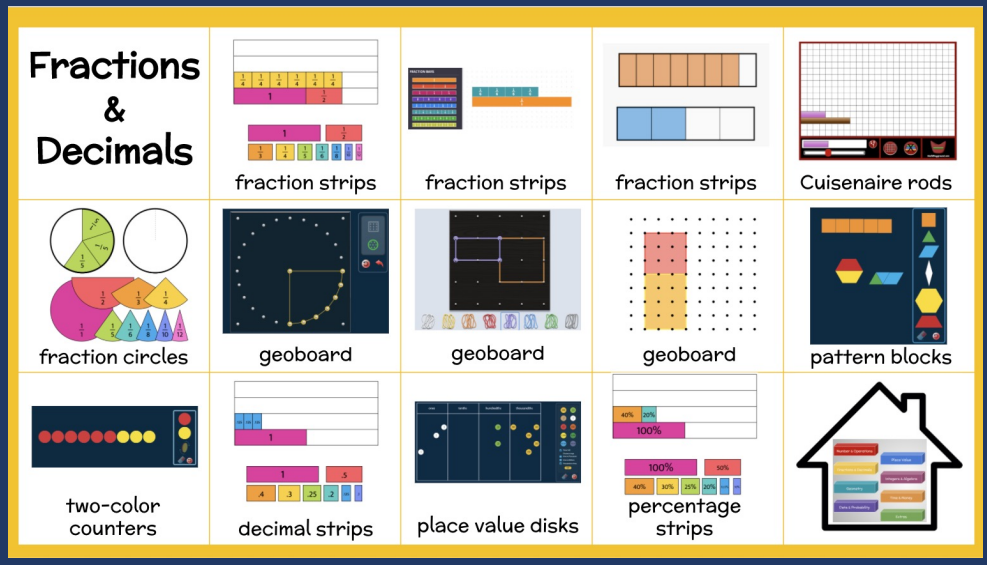
Copyright 2022 Sarah R. Powell, Ph.D.



Two-dimensional images



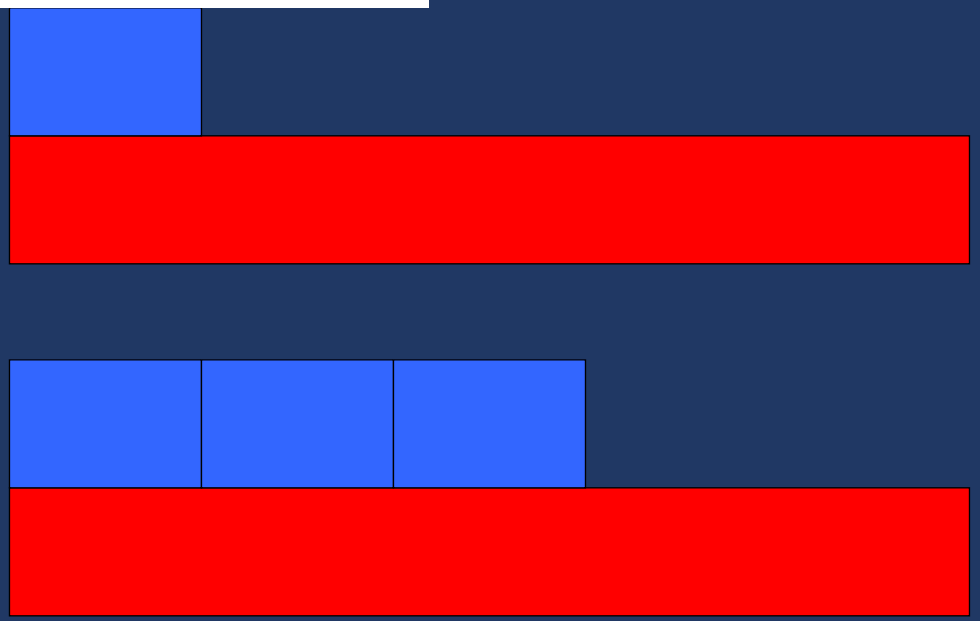
https://bit.ly/srpowell



Copyright 2022 Sarah R. Powell, Ph.D.

Addition

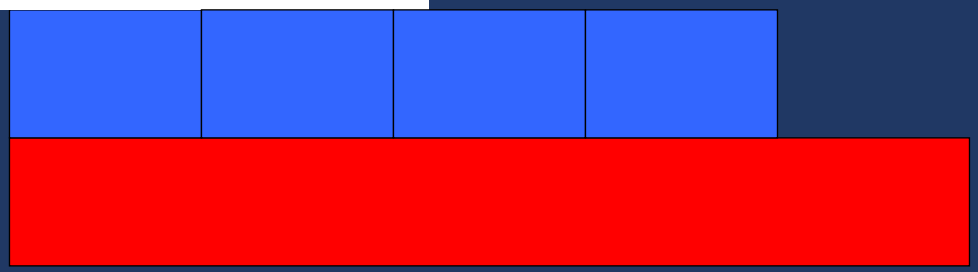
$$\frac{1}{5} + \frac{3}{5}$$

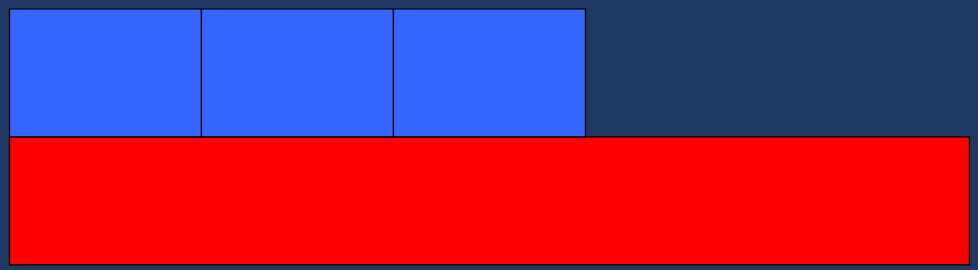


Copyright 2022 Sarah R. Powell, Ph.D.

Addition

$$\frac{1}{5} + \frac{3}{5}$$





Copyright 2022 Sarah R. Powell, Ph.D.

Fraction Computation:
Addition and Subtraction

Problem	Representation
$\frac{1}{5} + \frac{3}{5}$	
$\frac{2}{3} + \frac{2}{3}$	
$\frac{1}{2} + \frac{1}{4}$	
$\frac{1}{4} + \frac{4}{6}$	
$\frac{4}{5} - \frac{1}{5}$	
$\frac{6}{5} - \frac{2}{5}$	
$\frac{7}{8} - \frac{2}{4}$	
$\frac{1}{2} - \frac{2}{5}$	

Copyright 2022 Sarah R. Powell, Ph.D.

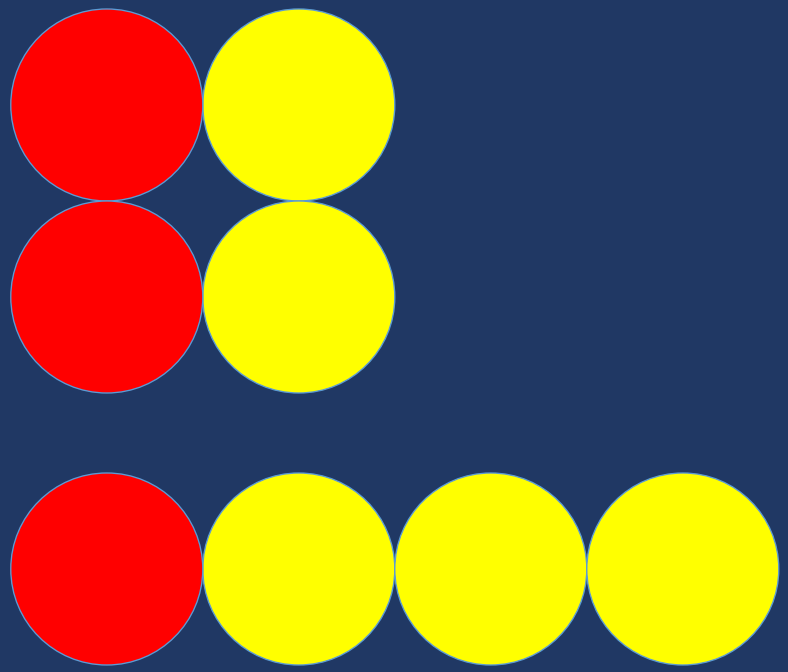
Addition

$$\frac{1}{2} + \frac{1}{4}$$

Copyright 2022 Sarah R. Powell, Ph.D.

Addition

$$\frac{1}{2} + \frac{1}{4}$$

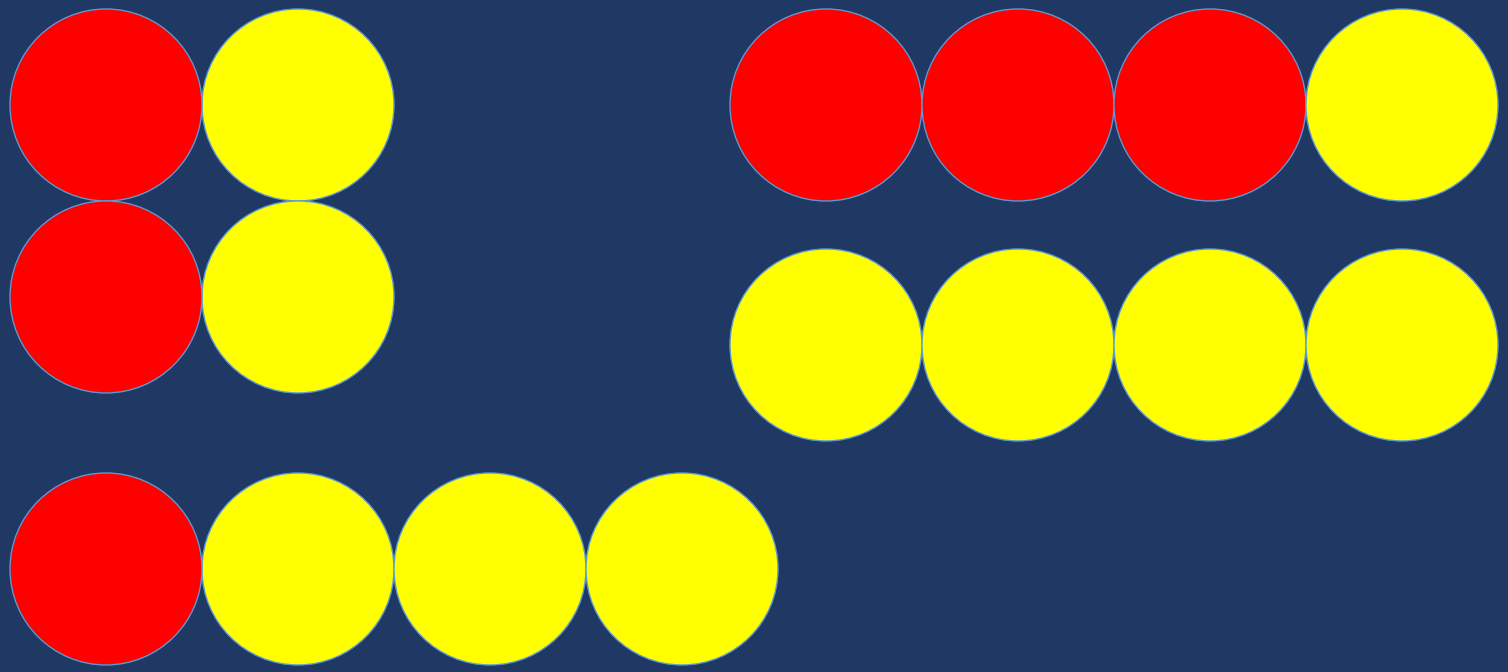


2: 2, 4, 6, 8, 10
4: 4, 8, 12, 16, 20

Copyright 2022 Sarah R. Powell, Ph.D.

Addition

$$\frac{1}{2} + \frac{1}{4}$$



Copyright 2022 Sarah R. Powell, Ph.D.

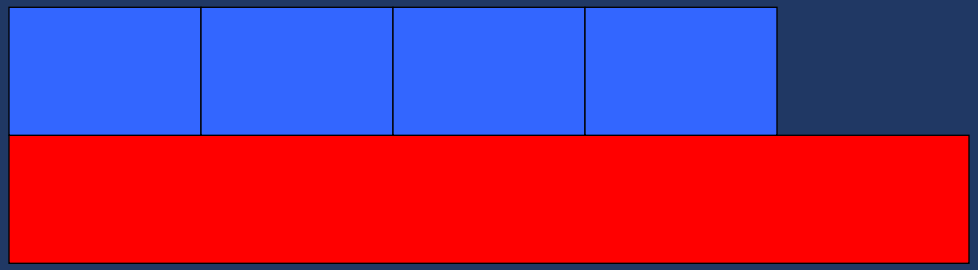
Fraction Computation:
Addition and Subtraction

Problem	Representation
$\frac{1}{5} + \frac{3}{5}$	
$\frac{2}{3} + \frac{2}{3}$	
$\frac{1}{2} + \frac{1}{4}$	
$\frac{1}{4} + \frac{4}{6}$	
$\frac{4}{5} - \frac{1}{5}$	
$\frac{6}{5} - \frac{2}{5}$	
$\frac{7}{8} - \frac{2}{4}$	
$\frac{1}{2} - \frac{2}{5}$	

Copyright 2022 Sarah R. Powell, Ph.D.

Subtraction

$$\frac{4}{5} - \frac{1}{5}$$



Copyright 2022 Sarah R. Powell, Ph.D.

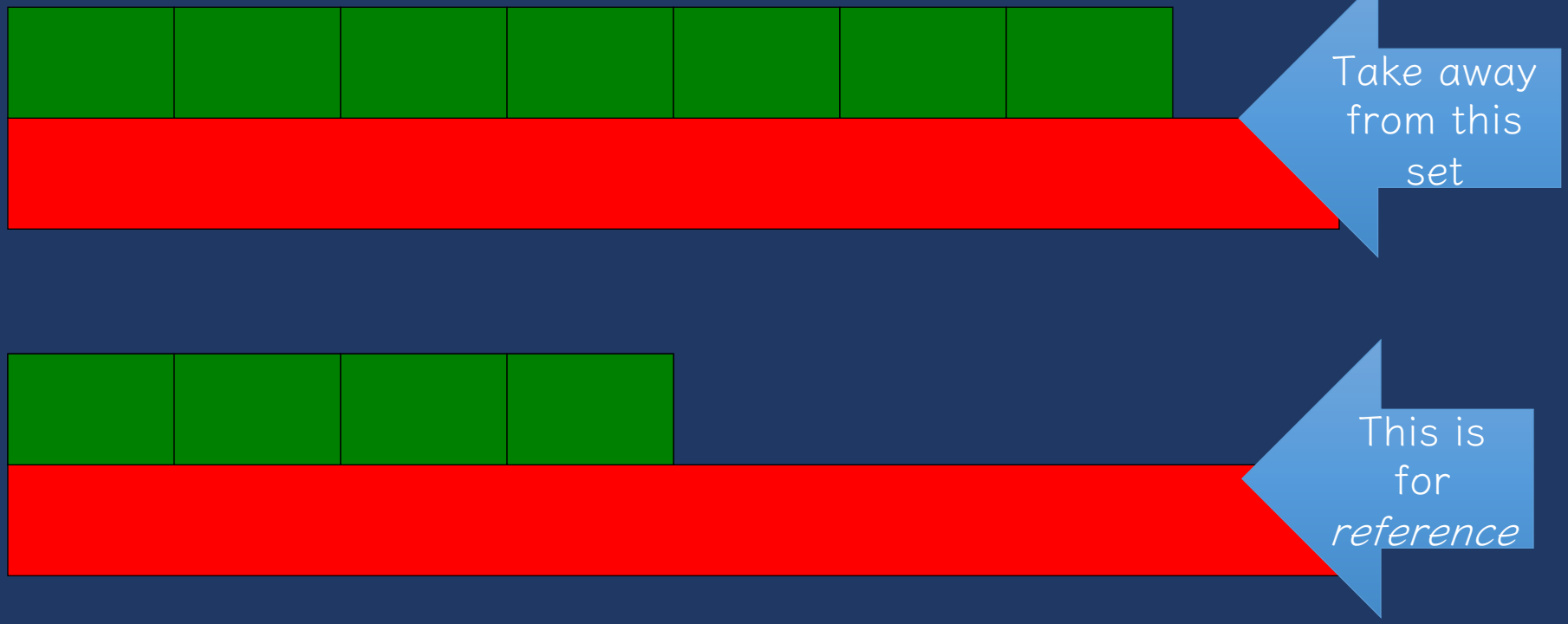
Fraction Computation:
Addition and Subtraction

Problem	Representation
$\frac{1}{5} + \frac{3}{5}$	
$\frac{2}{3} + \frac{2}{3}$	
$\frac{1}{2} + \frac{1}{4}$	
$\frac{1}{4} + \frac{4}{6}$	
$\frac{4}{5} - \frac{1}{5}$	
$\frac{6}{5} - \frac{2}{5}$	
$\frac{7}{8} - \frac{2}{4}$	
$\frac{1}{2} - \frac{2}{5}$	

Copyright 2022 Sarah R. Powell, Ph.D.

Subtraction

$$\frac{7}{8} - \frac{2}{4}$$



Copyright 2022 Sarah R. Powell, Ph.D.

Fraction Computation:
Addition and Subtraction

Problem	Representation
$\frac{1}{5} + \frac{3}{5}$	
$\frac{2}{3} + \frac{2}{3}$	
$\frac{1}{2} + \frac{1}{4}$	
$\frac{1}{4} + \frac{4}{6}$	
$\frac{4}{5} - \frac{1}{5}$	
$\frac{6}{5} - \frac{2}{5}$	
$\frac{7}{8} - \frac{2}{4}$	
$\frac{1}{2} - \frac{2}{5}$	

Copyright 2022 Sarah R. Powell, Ph.D.

Multiplication

Multiplication

- Interpret multiplication sign as "of"
  - 2/3 *of* 3/4

Fraction Computation:
Multiplication

Problem	Representation
$2 \times \frac{1}{4}$	
$\frac{1}{2} \times \frac{4}{4}$	
$\frac{1}{2} \times \frac{2}{4}$	
$\frac{1}{2} \times \frac{3}{4}$	
$\frac{2}{3} \times \frac{3}{3}$	
$\frac{2}{5} \times \frac{5}{6}$	
$\frac{1}{4} \times \frac{2}{3}$	
$\frac{3}{4} \times \frac{1}{3}$	

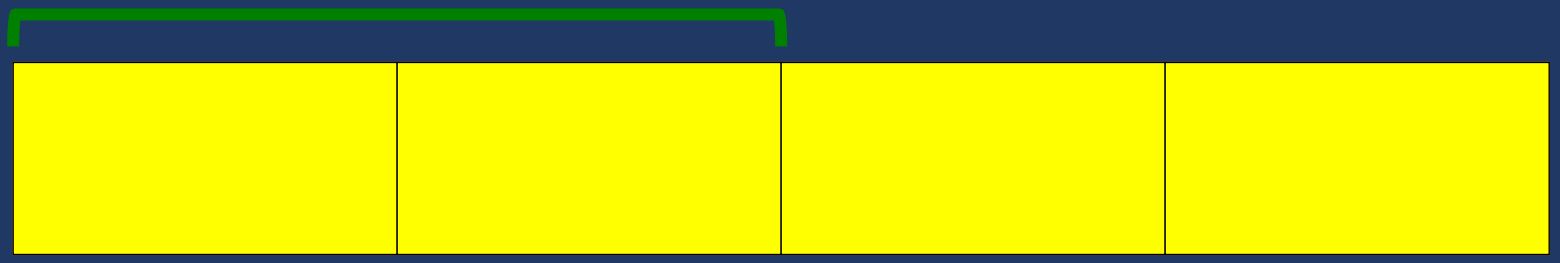
Copyright 2022 Sarah R. Powell, Ph.D.

Multiplication

$$\frac{1}{2} \times \frac{4}{4}$$

Show

One-half *of* four-fourths



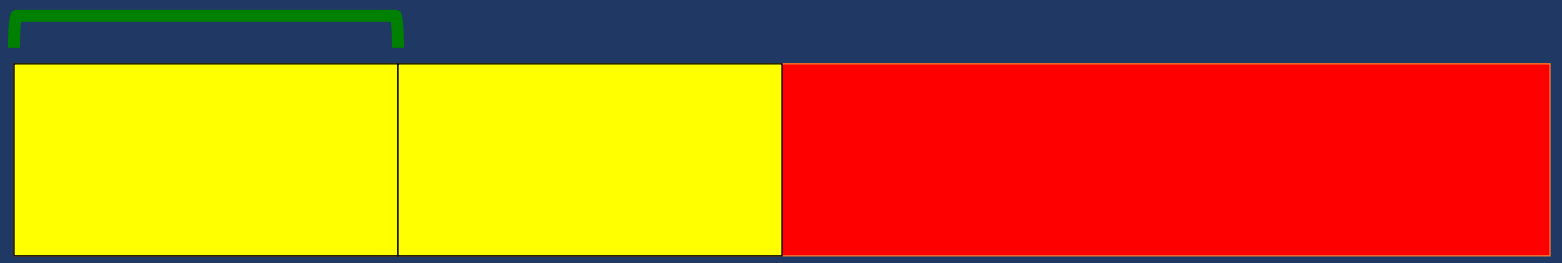
Copyright 2022 Sarah R. Powell, Ph.D.

Multiplication

$$\frac{1}{2} \times \frac{2}{4}$$

Show

One-half *of* two-fourths



Copyright 2022 Sarah R. Powell, Ph.D.

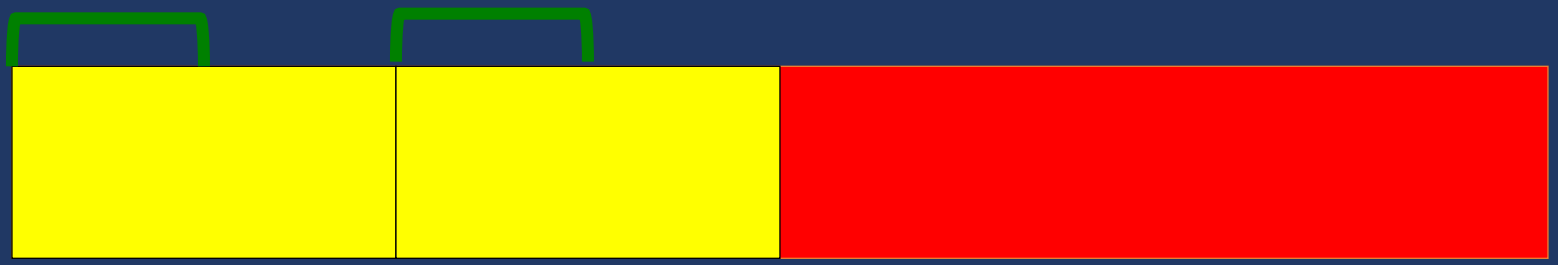
Multiplication

$$\frac{1}{2} \times \frac{2}{4}$$

Show

One-half *of* one-fourth

One-half *of* one-fourth



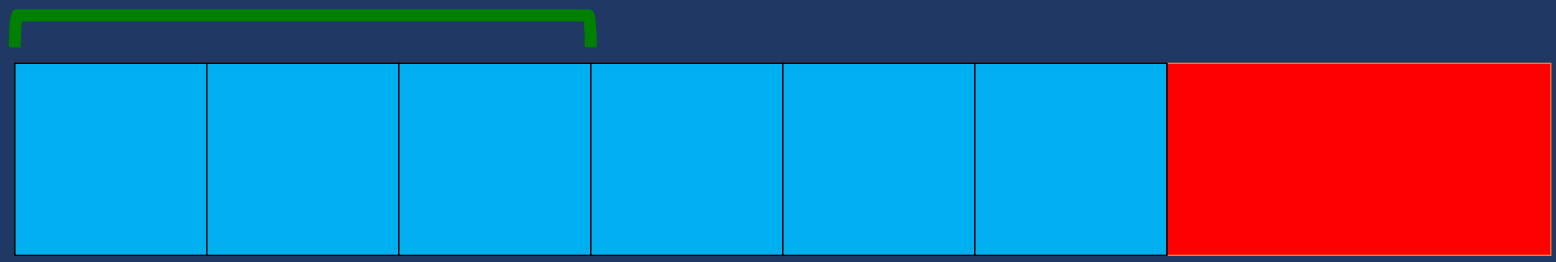
Copyright 2022 Sarah R. Powell, Ph.D.

Multiplication

$$\frac{1}{2} \times \frac{3}{4}$$

Show

One-half *of* three-fourths



Copyright 2022 Sarah R. Powell, Ph.D.

Multiplication

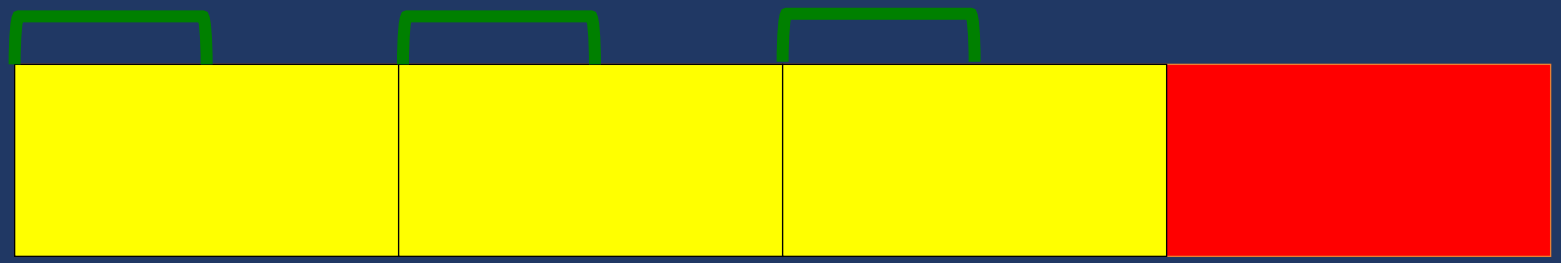
$$\frac{1}{2} \times \frac{3}{4}$$

Show

One-half *of* one-fourth

One-half *of* one-fourth

One-half *of* one-fourth

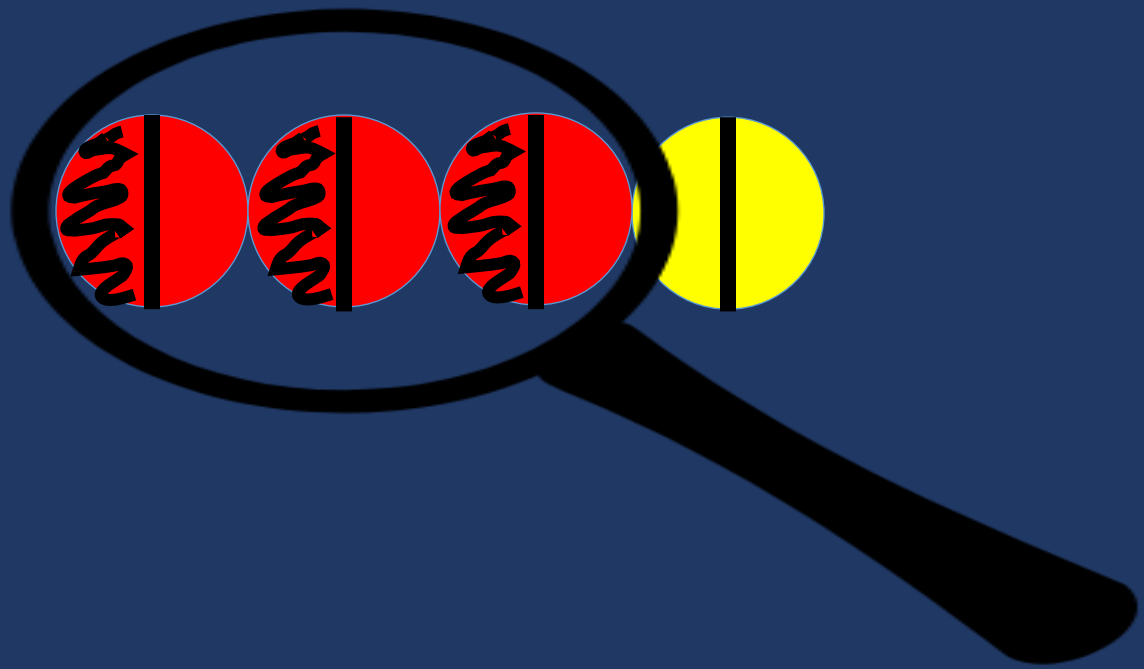


Copyright 2022 Sarah R. Powell, Ph.D.

Multiplication

$$\frac{1}{2} \times \frac{3}{4}$$

Show



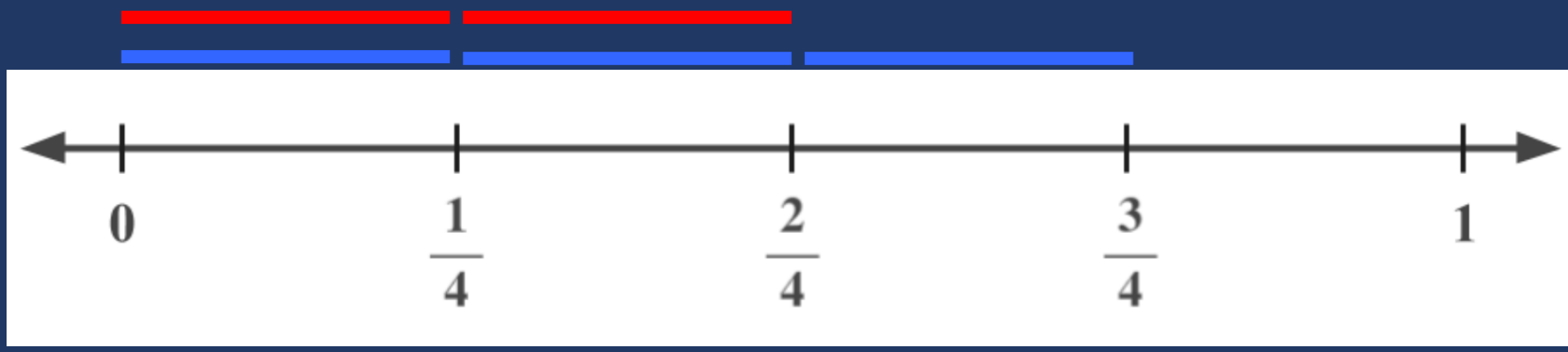
Copyright 2022 Sarah R. Powell, Ph.D.

Multiplication

Length

$$\frac{2}{3} \times \frac{3}{4} = \frac{1}{2}$$

"Two-thirds of three-fourths"



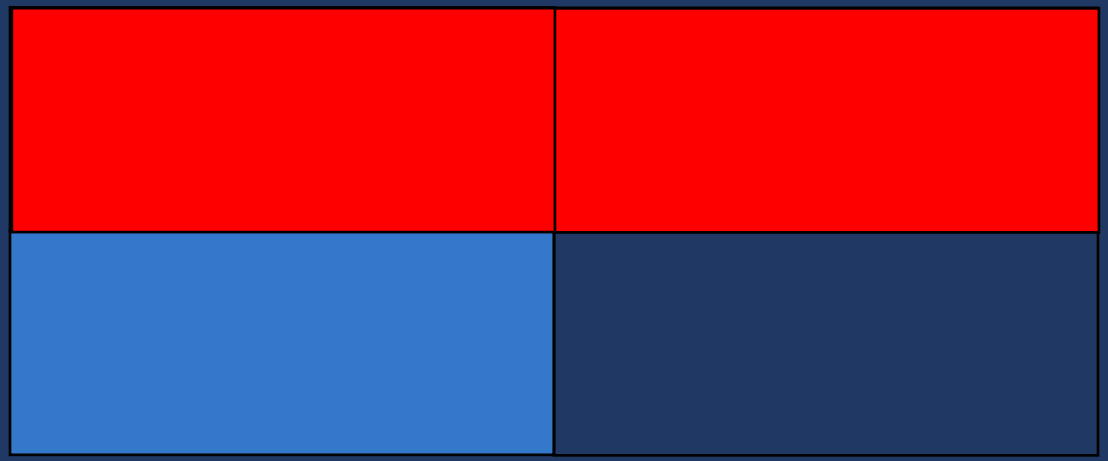
Copyright 2022 Sarah R. Powell, Ph.D.

Multiplication

Area

$$\frac{2}{3} \times \frac{3}{4} = \frac{1}{2}$$

"Two-thirds of three-fourths"



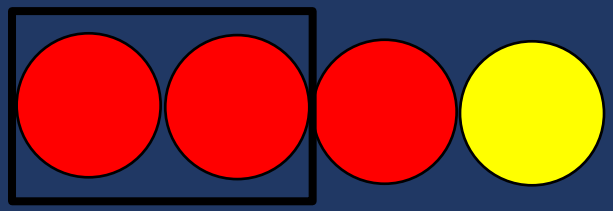
Copyright 2022 Sarah R. Powell, Ph.D.

Multiplication

Set

$$\frac{2}{3} \times \frac{3}{4} = \frac{1}{2}$$

"Two-thirds of three-fourths"



Copyright 2022 Sarah R. Powell, Ph.D.

Fraction Computation: Multiplication

Problem	Representation
$2 \times \frac{1}{4}$	
$\frac{1}{2} \times \frac{4}{4}$	
$\frac{1}{2} \times \frac{2}{4}$	
$\frac{1}{2} \times \frac{3}{4}$	
$\frac{2}{3} \times \frac{3}{3}$	
$\frac{2}{5} \times \frac{5}{6}$	
$\frac{1}{4} \times \frac{2}{3}$	
$\frac{3}{4} \times \frac{1}{3}$	

Copyright 2022 Sarah R. Powell, Ph.D.

Division

Division

- "How many sets of the second fraction fit into the first fraction?"

Fraction Computation:
Division

Problem	Representation
$\frac{3}{3} \div 3$	
$\frac{3}{3} \div \frac{1}{3}$	
$\frac{2}{3} \div \frac{1}{3}$	
$\frac{5}{6} \div \frac{1}{2}$	
$\frac{7}{8} \div \frac{3}{4}$	
$\frac{1}{4} \div \frac{1}{2}$	
$\frac{3}{4} \div \frac{2}{3}$	
$\frac{4}{5} \div \frac{1}{2}$	

Copyright 2022 Sarah R. Powell, Ph.D.

Division

$$\frac{3}{3} \div \frac{1}{3}$$

Show

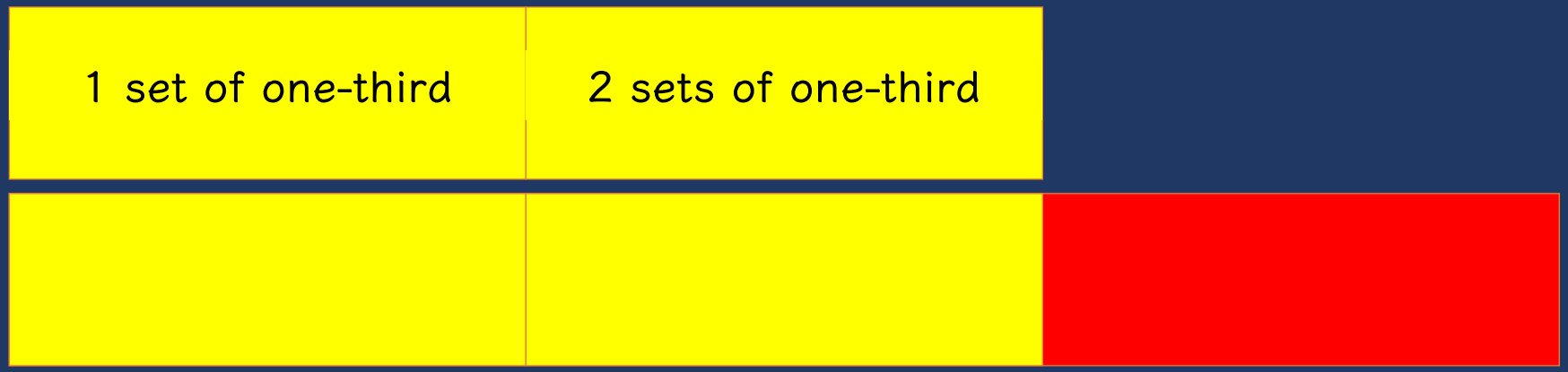
1 set of one-third	2 sets of one-third	3 sets of one-third

Copyright 2022 Sarah R. Powell, Ph.D.

Division

$$\frac{2}{3} \div \frac{1}{3}$$

Show

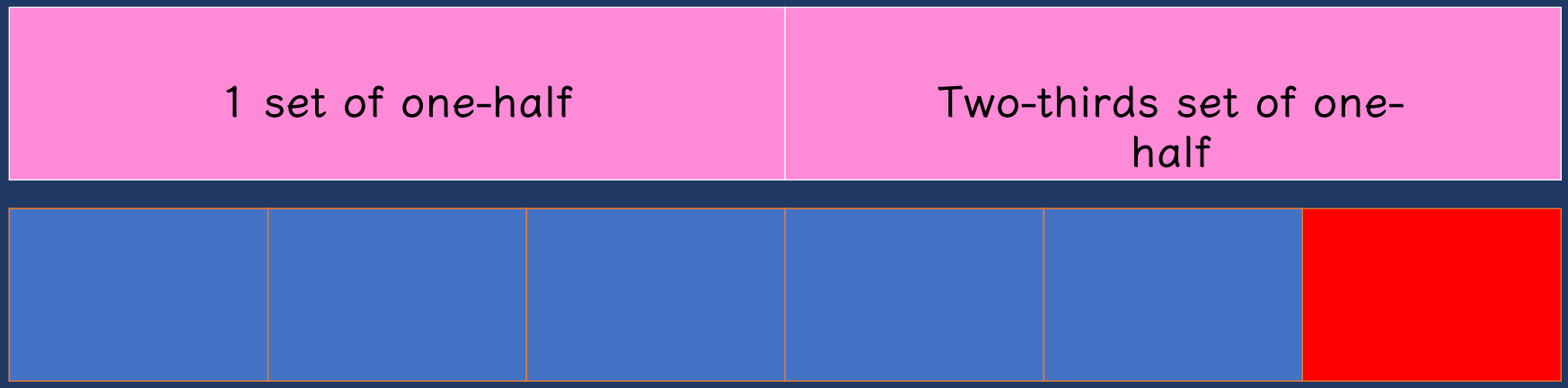


Copyright 2022 Sarah R. Powell, Ph.D.

Division

$$\frac{5}{6} \div \frac{1}{2}$$

Show

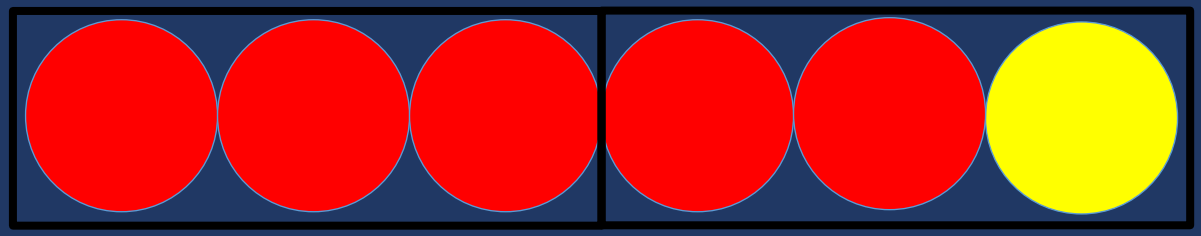


Copyright 2022 Sarah R. Powell, Ph.D.

Division

$$\frac{5}{6} \div \frac{1}{2}$$

Show



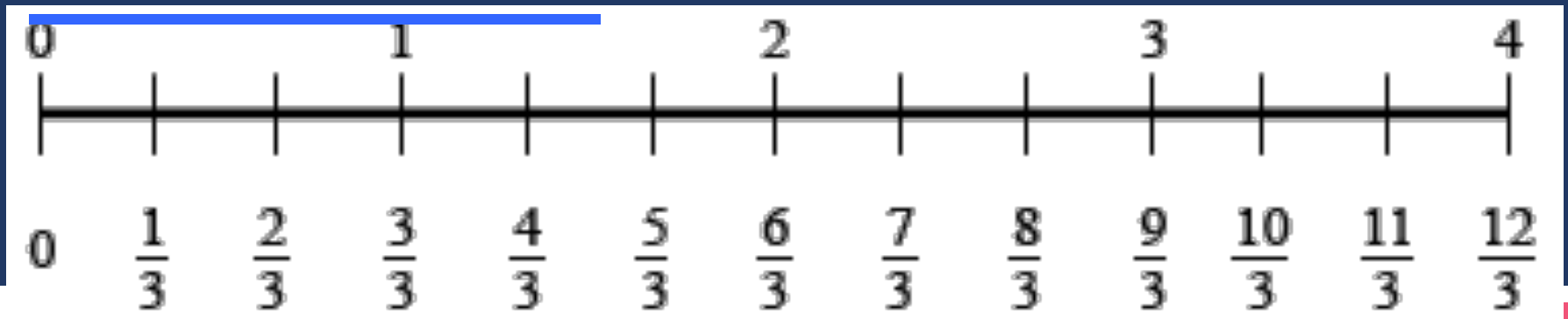
Copyright 2022 Sarah R. Powell, Ph.D.

Division

Length

$$1\frac{1}{2} \div \frac{1}{3}$$

"How many sets of 1/3 can be made with 1 and ½?"



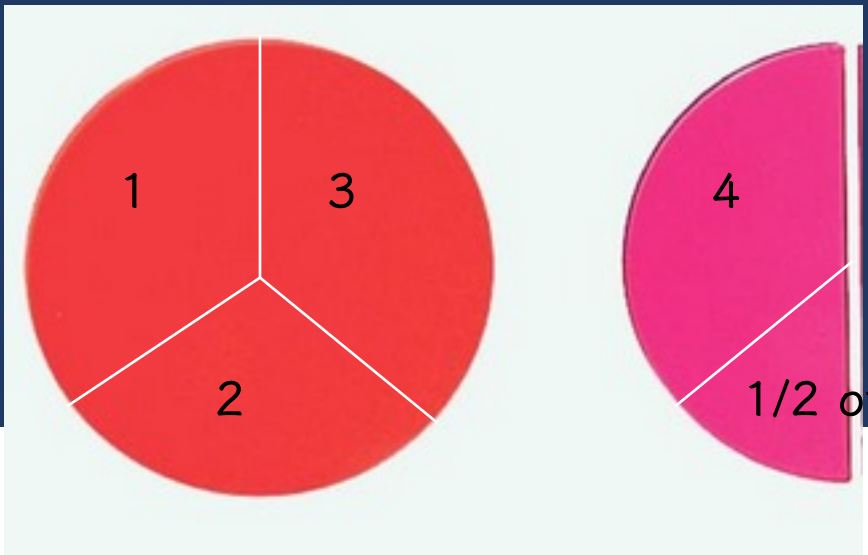
Copyright 2022 Sarah R. Powell, Ph.D.

Division

Area

$$1\frac{1}{2} \div \frac{1}{3}$$

"How many sets of 1/3 can be made with 1 and ½?"



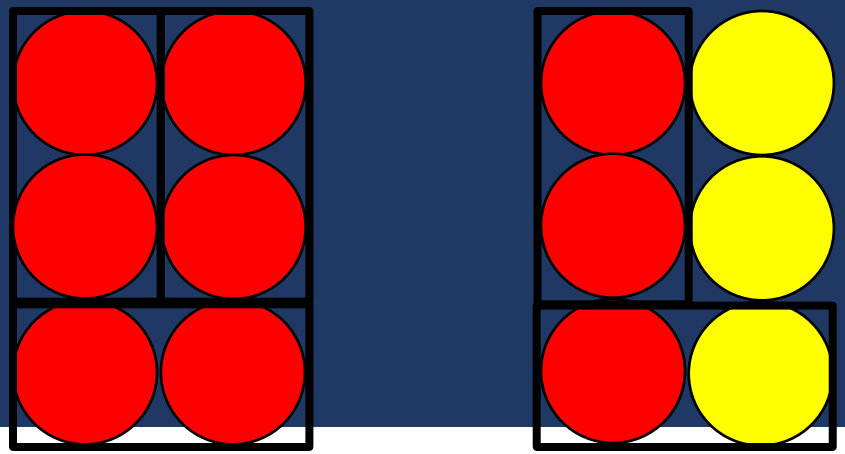
Copyright 2022 Sarah R. Powell, Ph.D.

Division

Set

$$1\frac{1}{2} \div \frac{1}{3}$$

"How many sets of 1/3 can be made with 1 and ½?"

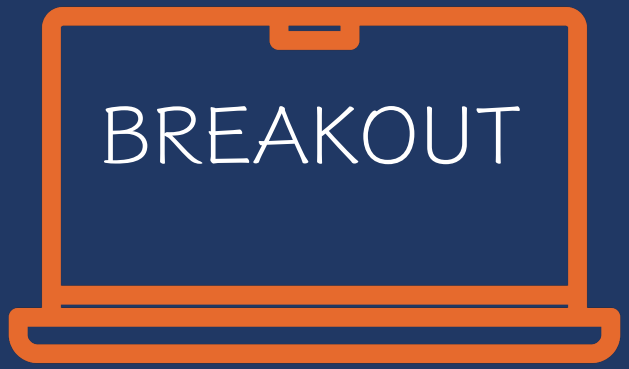


Copyright 2022 Sarah R. Powell, Ph.D.

Fraction Computation:
Division

Problem	Representation
$\frac{3}{3} \div 3$	
$\frac{3}{3} \div \frac{1}{3}$	
$\frac{2}{3} \div \frac{1}{3}$	
$\frac{5}{6} \div \frac{1}{2}$	
$\frac{7}{8} \div \frac{3}{4}$	
$\frac{1}{4} \div \frac{1}{2}$	
$\frac{3}{4} \div \frac{2}{3}$	
$\frac{4}{5} \div \frac{1}{2}$	

Copyright 2022 Sarah R. Powell, Ph.D.

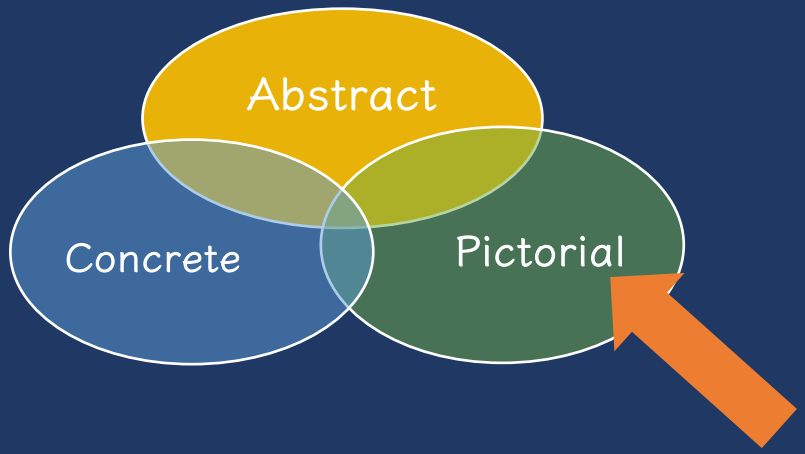


1. Share some of your favorite hands-on materials for fraction computation.
2. Share some of your favorite virtual manipulatives for fraction computation.
3. Considerations for using these tools with students?

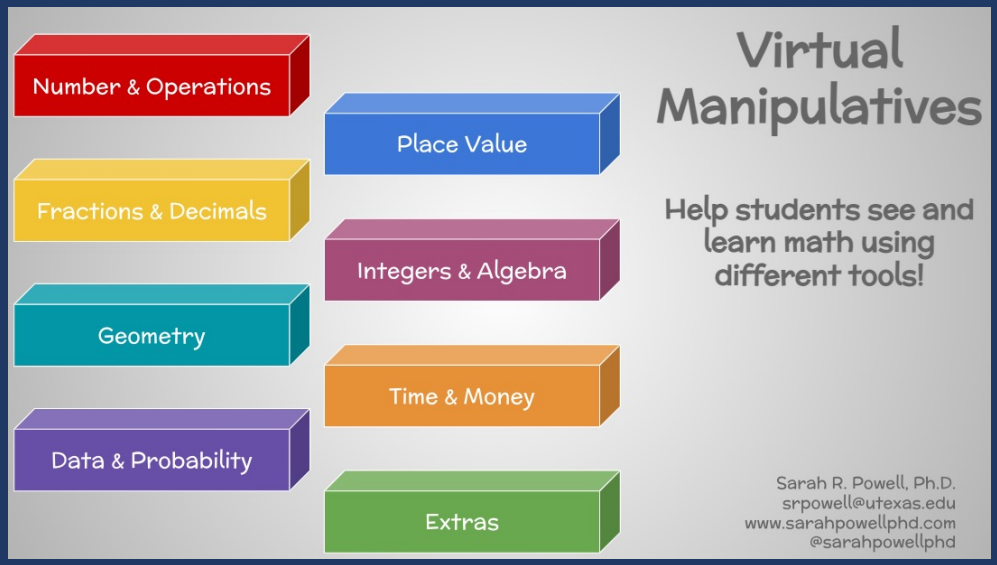
Copyright 2022 Sarah R. Powell, Ph.D.

Manipulatives: Decimals

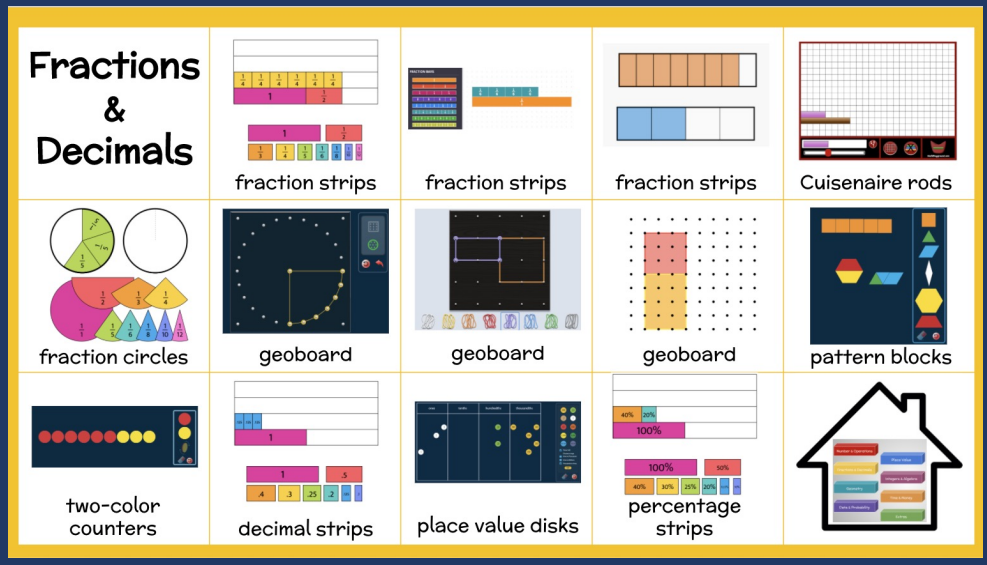
Copyright 2022 Sarah R. Powell, Ph.D.



Two-dimensional images

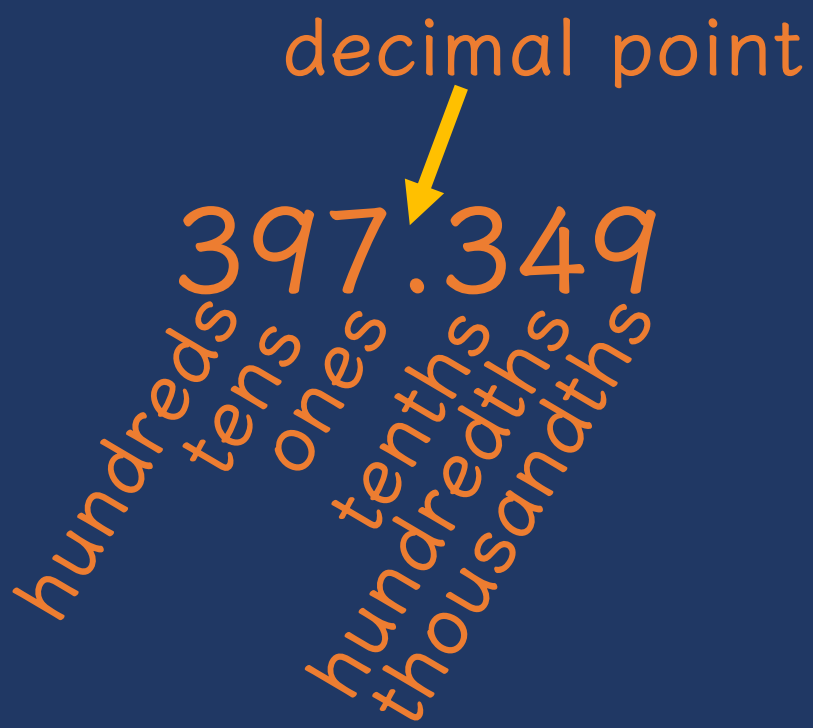


https://bit.ly/srpowell



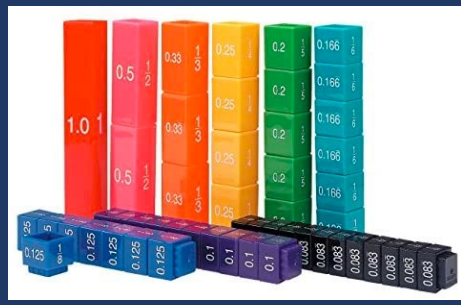
Copyright 2022 Sarah R. Powell, Ph.D.

Decimal



Copyright 2022 Sarah R. Powell, Ph.D.

$$\frac{3}{10}$$



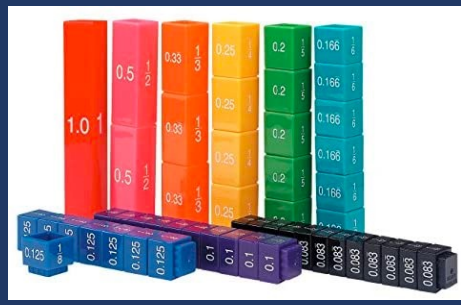
Copyright 2022 Sarah R. Powell, Ph.D.

1.0

$\frac{1}{8}$

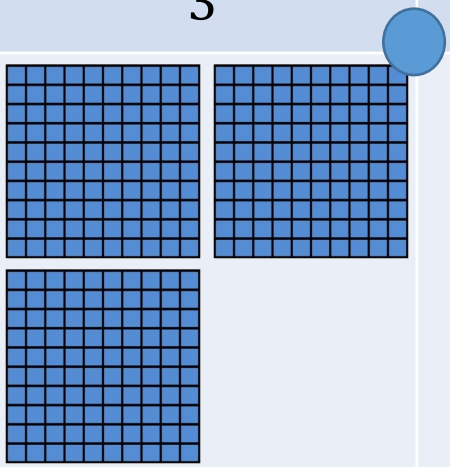
0.125

$\frac{1}{8}$

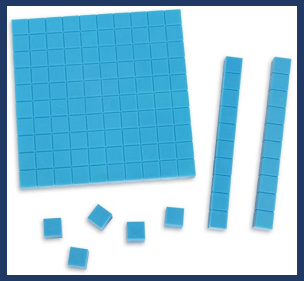


Copyright 2022 Sarah R. Powell, Ph.D.

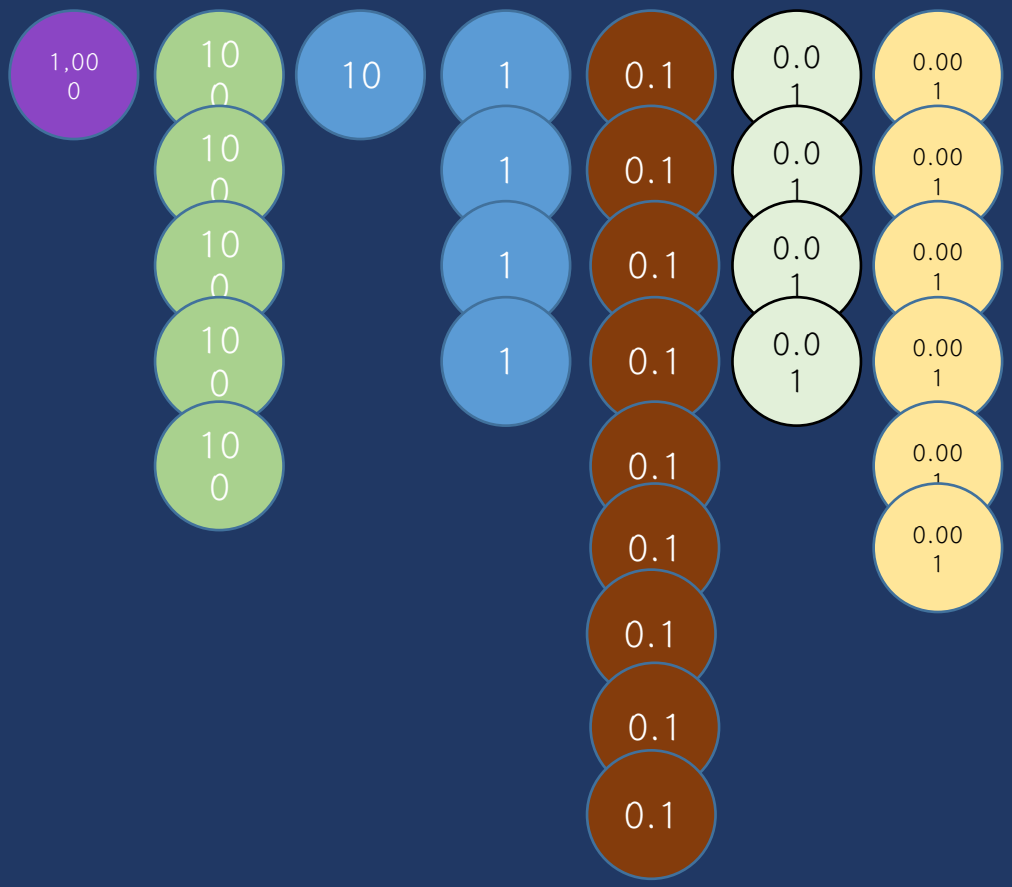
Ones	Tenths	Hundredths
3	4	6



3.46



Copyright 2022 Sarah R. Powell, Ph.D.

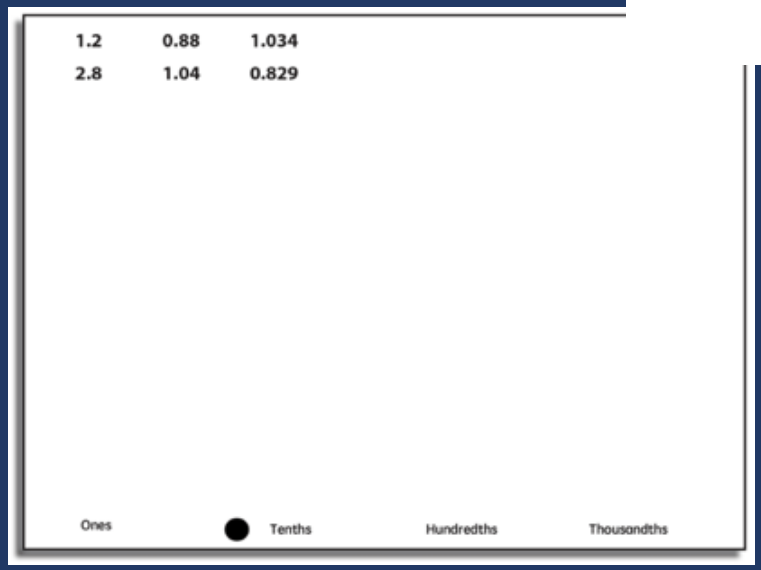


1,504.946

Copyright 2022 Sarah R. Powell, Ph.D.

Decimals and Place Value

Show...



Copyright 2022 Sarah R. Powell, Ph.D.

Decimals

Computation

Problem	Representation
2.34 **+ 1.61**	
1.98 **+ 0.34**	
2.34 **– 1.61**	
3.09 **– 1.88**	

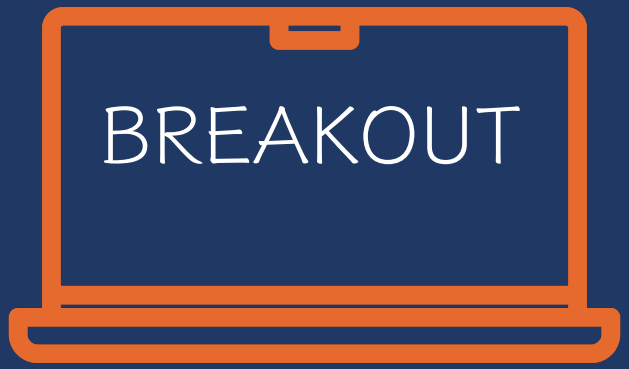
Copyright 2022 Sarah R. Powell, Ph.D.

Decimals

Computation

Problem	Representation
$\begin{array}{r} 0.52 \\ \times \quad 3 \\ \hline \end{array}$	
$\begin{array}{r} 0.52 \\ \times \quad 34 \\ \hline \end{array}$	
1.24 ÷ 2	
1.27 ÷ 5	

Copyright 2022 Sarah R. Powell, Ph.D.



1. Share some of your favorite hands-on materials for decimals.
2. Share some of your favorite virtual manipulatives for decimals.
3. Considerations for using these tools with students?

Copyright 2022 Sarah R. Powell, Ph.D.

Manipulatives: Algebra

Copyright 2022 Sarah R. Powell, Ph.D.

Integer Concepts

Zero pairs

- A positive and a negative cancel one another
  - If you add a positive, you must add a negative
  - If you subtract a positive, you must subtract a negative

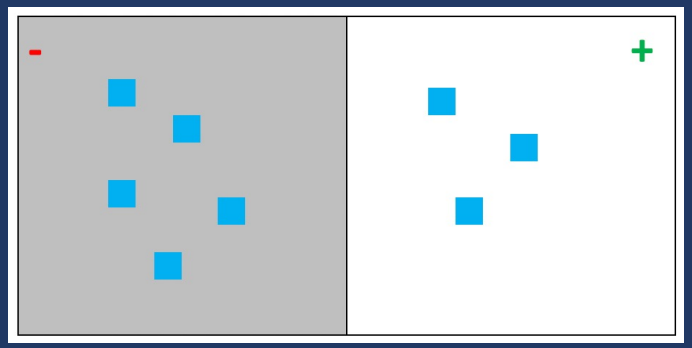
A number is assumed positive if a negative sign (-) doesn't proceed it

Be sure to use the negative sign (-) not the minus sign (–)

Copyright 2022 Sarah R. Powell, Ph.D.

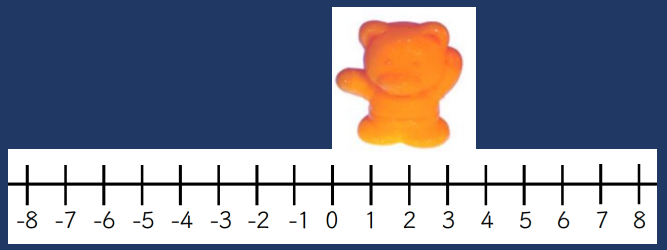
Ways to Teach Addition and Subtraction

MAT and CUBES



TWO-COLOR COUNTERS

NUMBER LINE

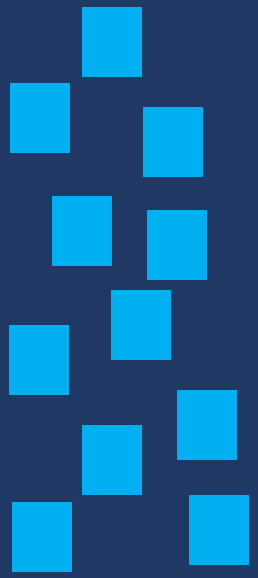


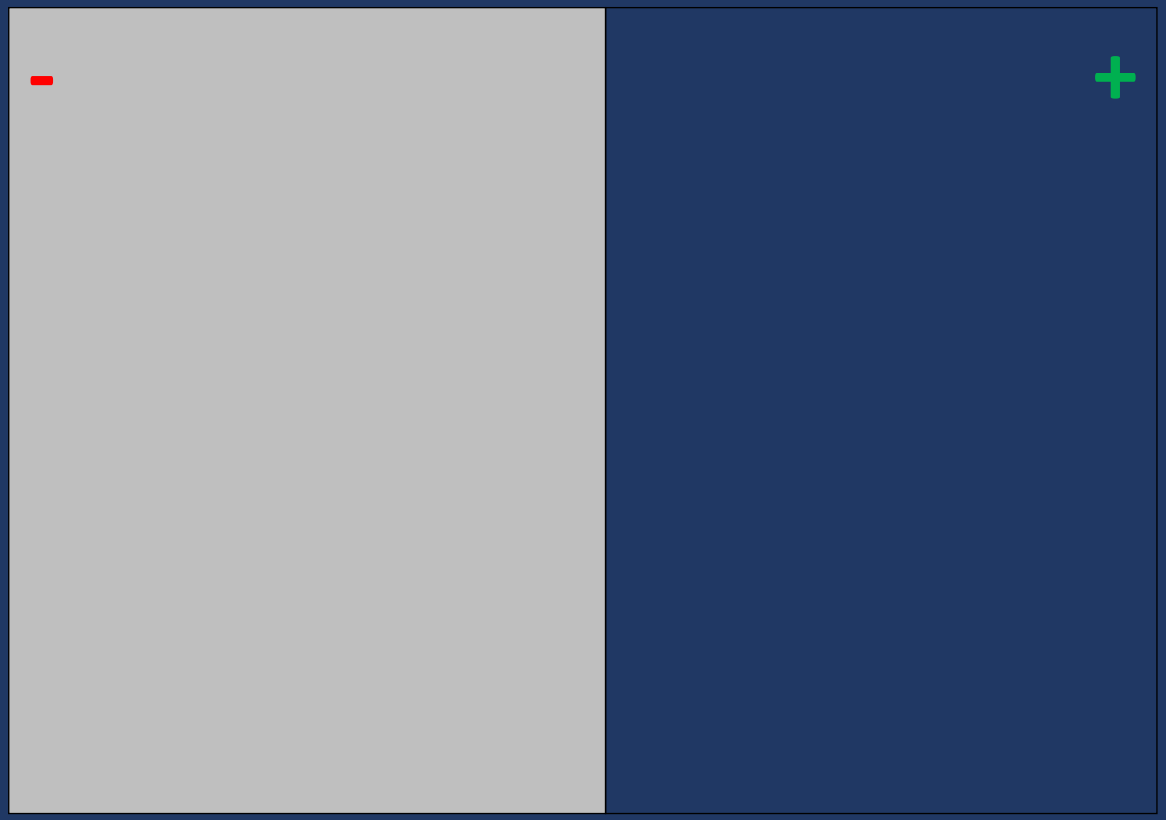
Copyright 2022 Sarah R. Powell, Ph.D.

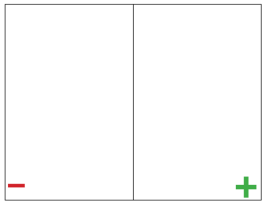
3 + 5

Copyright 2022 Sarah R. Powell, Ph.D.

3 + (-5)







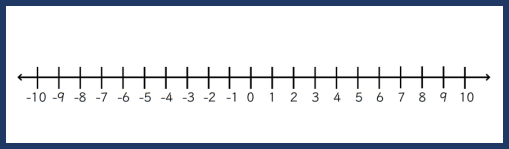
Use the mat in your handouts!

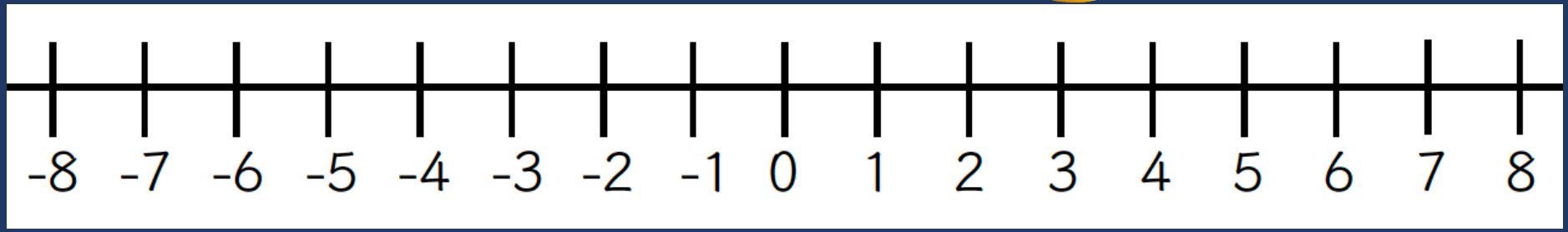
Copyright 2022 Sarah R. Powell, Ph.D.

3 + (-5)

Copyright 2022 Sarah R. Powell, Ph.D.

$3 + (-5)$





Copyright 2022 Sarah R. Powell, Ph.D.

Integers

Addition

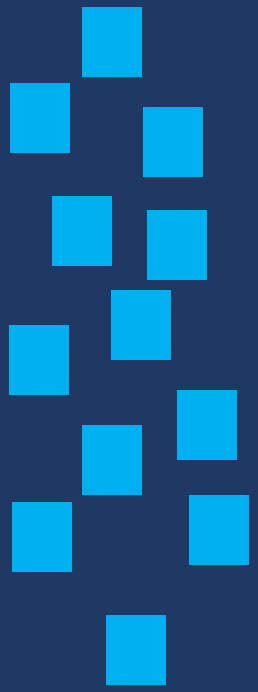
Problem	Representation
3 + 5	
3 + (-5)	
3 + (-5)	
3 + (-5)	
-2 + 6	
-6 + (-3)	
3 + (-1)	

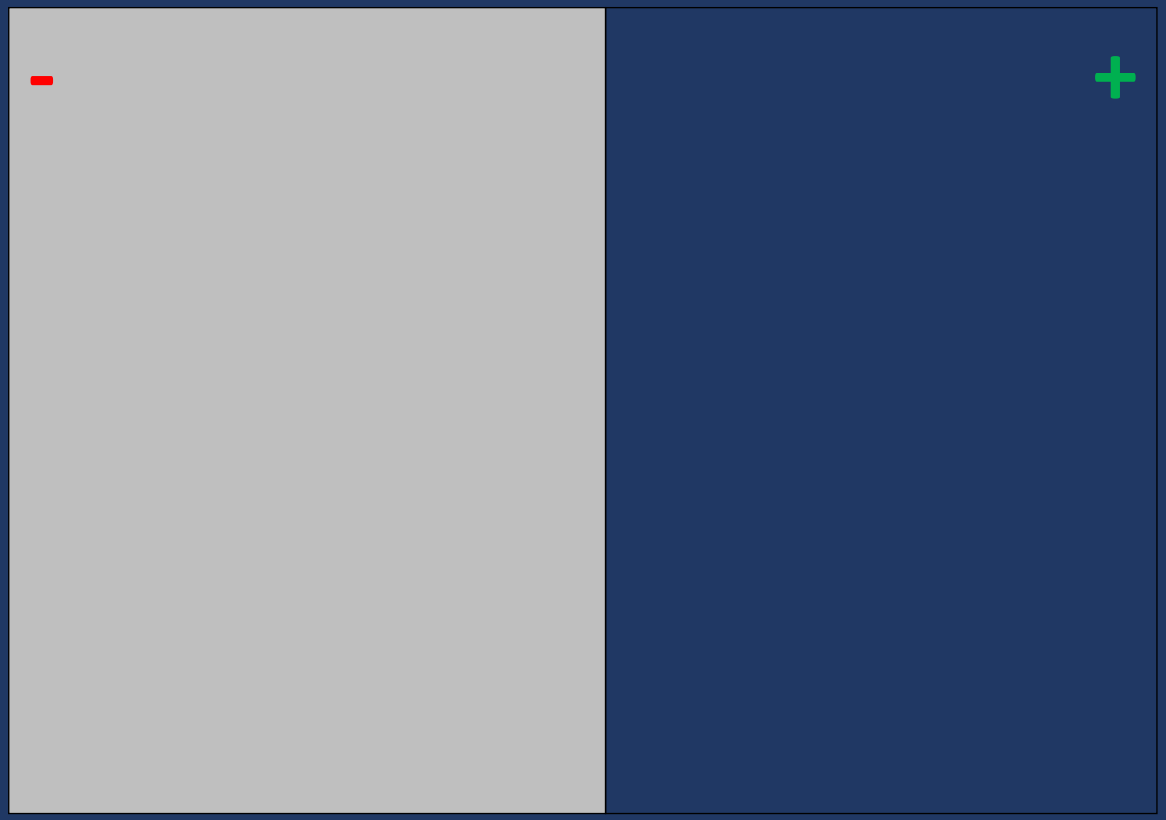
Copyright 2022 Sarah R. Powell, Ph.D.

5 – 3

Copyright 2022 Sarah R. Powell, Ph.D.

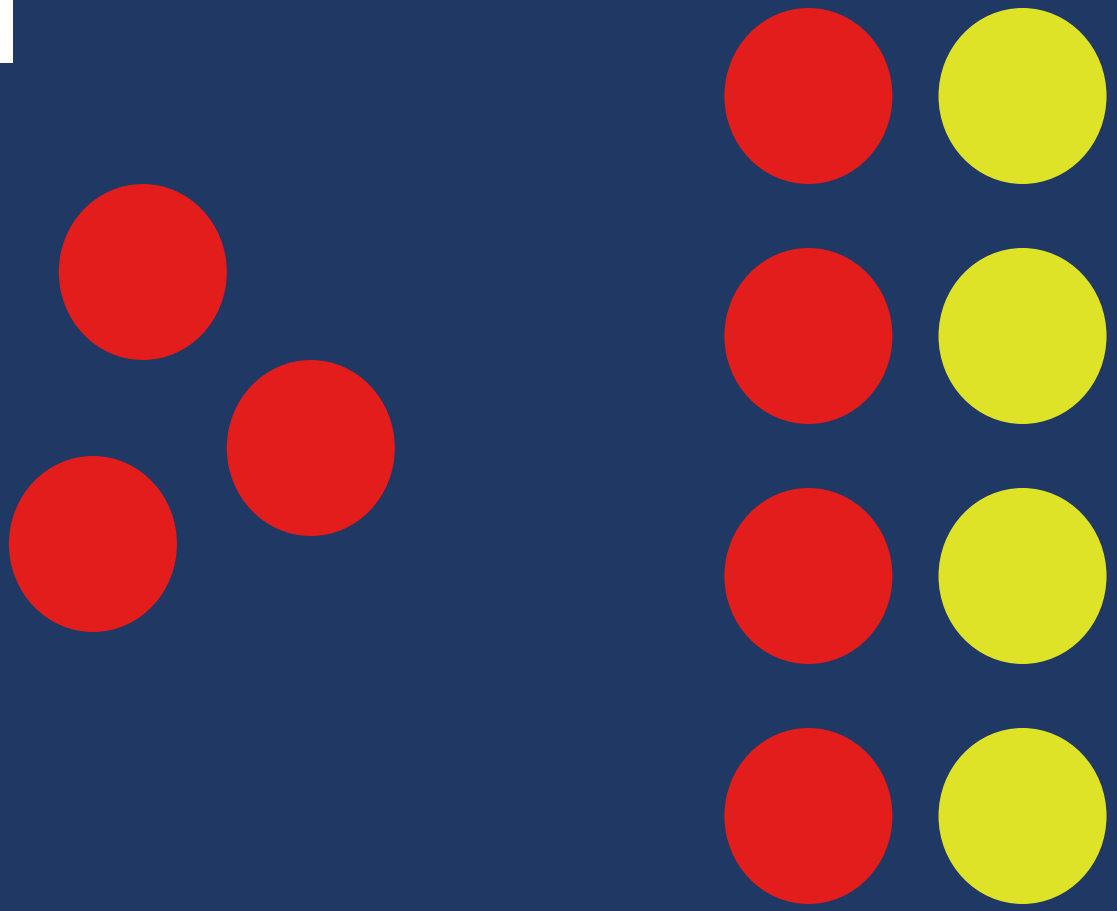
-3 – 4





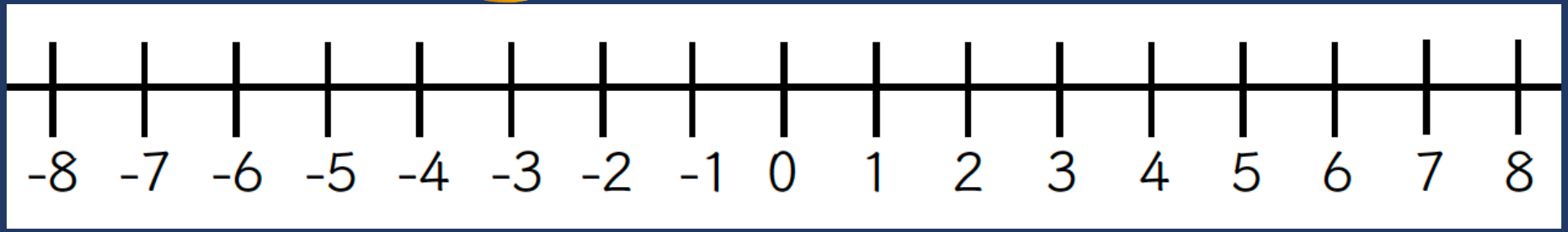
Copyright 2022 Sarah R. Powell, Ph.D.

-3 – 4



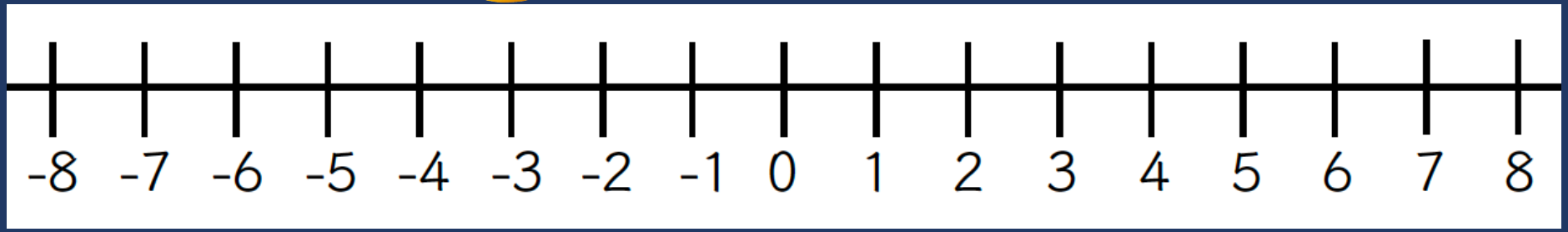
Copyright 2022 Sarah R. Powell, Ph.D.

-3 – 4



Copyright 2022 Sarah R. Powell, Ph.D.

-3 – 4



Copyright 2022 Sarah R. Powell, Ph.D.

Integers

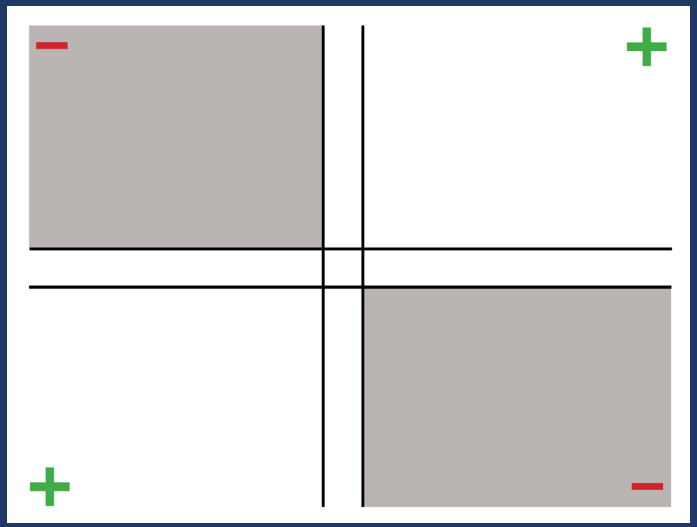
Subtraction

Problem	Representation
5 – 3	
-3 – 4	
-3 – 4	
-3 – 4	
2 – 5	
-2 – (-6)	
-3 – 2	

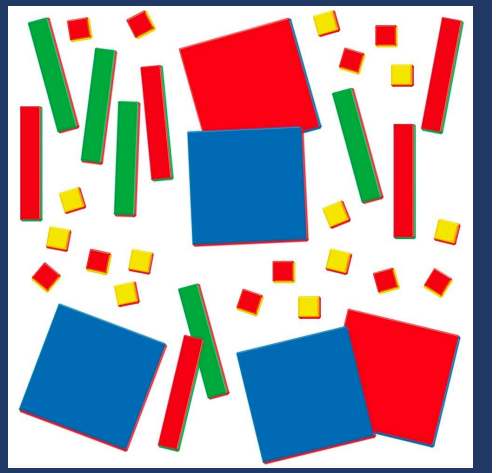
Copyright 2022 Sarah R. Powell, Ph.D.

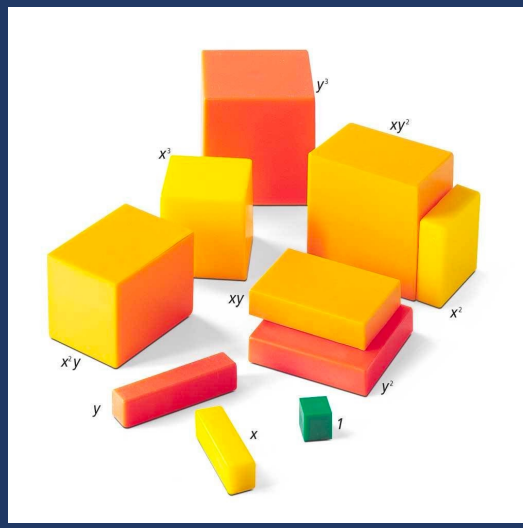
Ways to Teach Multiplication and Division

MAT and CUBES



ALGEBRA TILES/ALGEBLOCKS



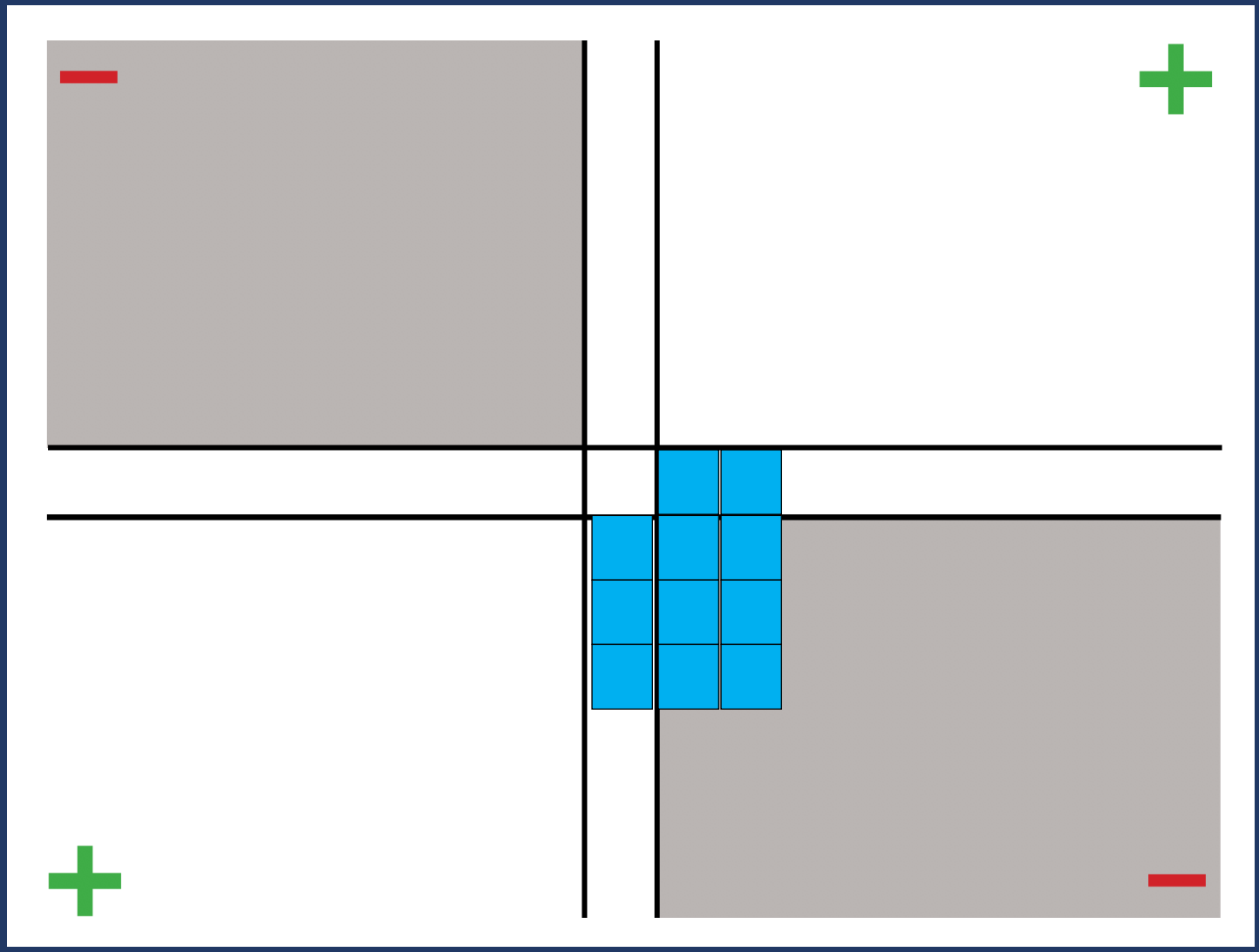


Copyright 2022 Sarah R. Powell, Ph.D.

2(3)

Copyright 2022 Sarah R. Powell, Ph.D.

(2)(-3)



Copyright 2022 Sarah R. Powell, Ph.D.

Integers

Multiplication and Division

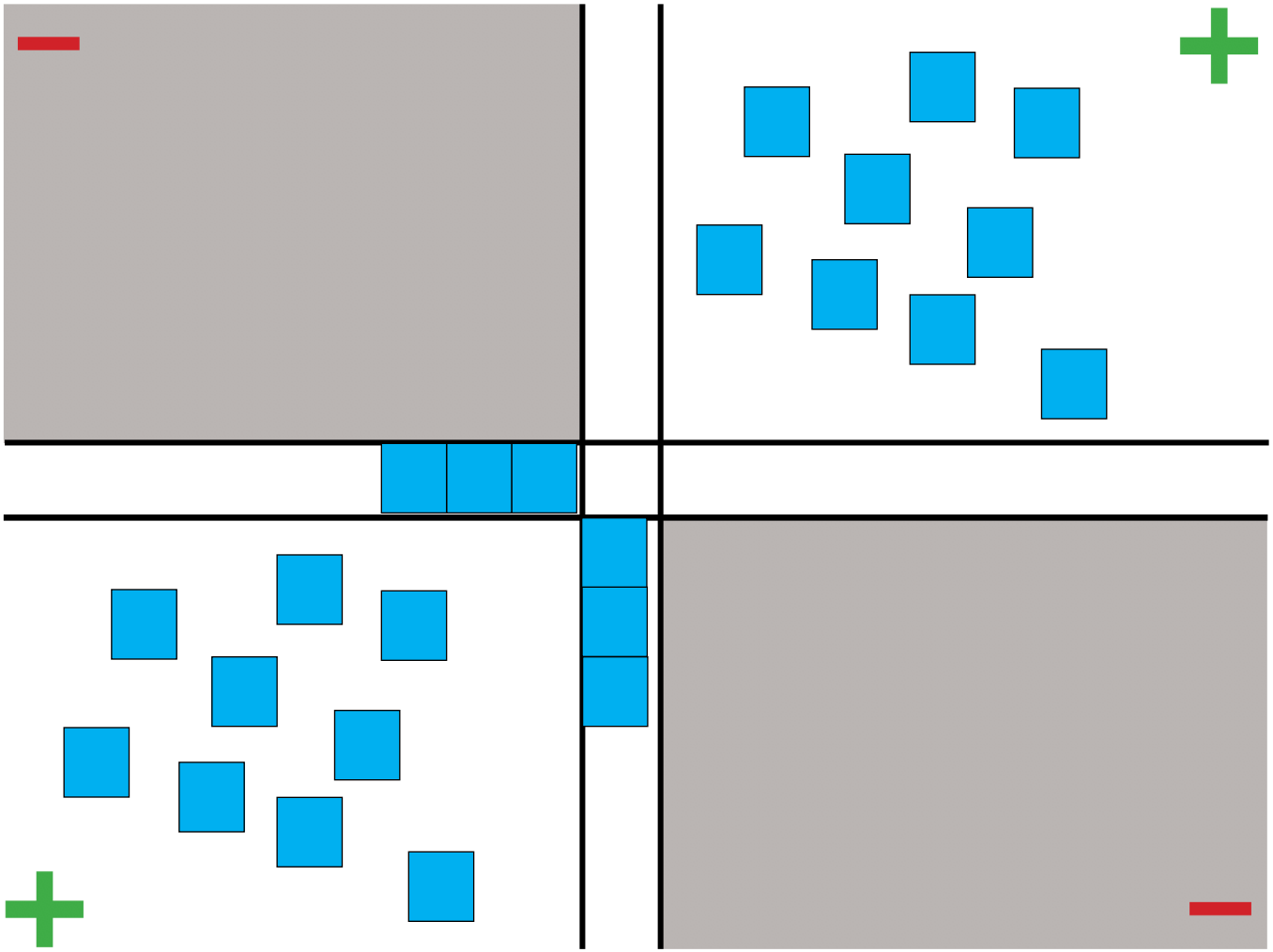
Problem	Representation
2(3)	
(2)(-3)	
(-2)(-3)	
$q \div 3$	
$q \div (-3)$	
$-q \div (-3)$	

Copyright 2022 Sarah R. Powell, Ph.D.

$9 \div 3$

Copyright 2022 Sarah R. Powell, Ph.D.

$q \div (-3)$



Copyright 2022 Sarah R. Powell, Ph.D.

Integers

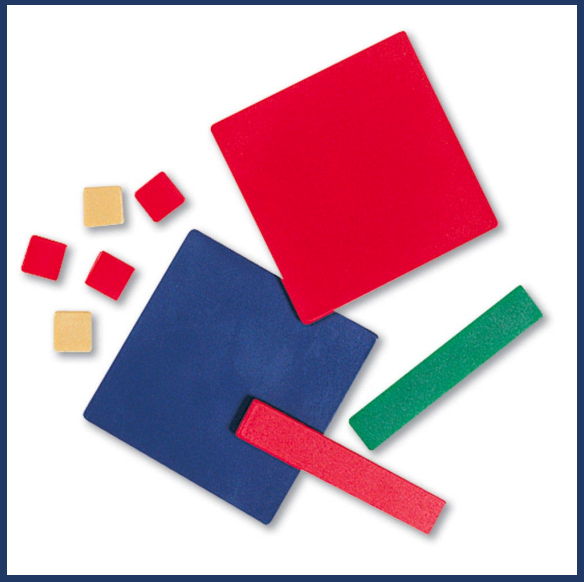
Multiplication and Division

Problem	Representation
2(3)	
(2)(-3)	
(-2)(-3)	
$q \div 3$	
$q \div (-3)$	
$-q \div (-3)$	

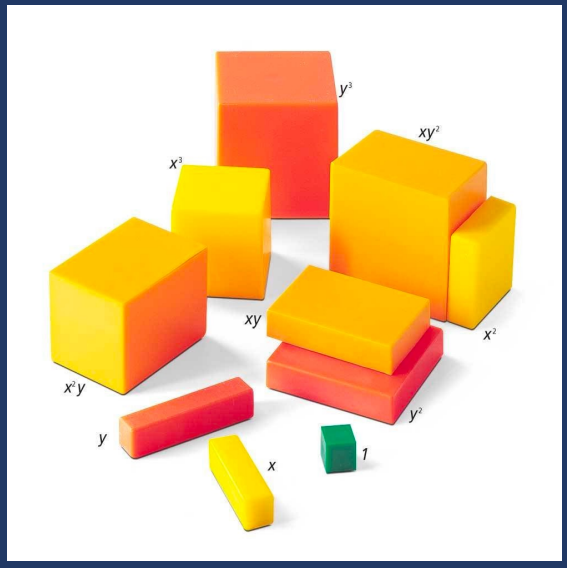
Copyright 2022 Sarah R. Powell, Ph.D.

cups/plates and counters

algebra tiles



Algeblocks



Copyright 2022 Sarah R. Powell, Ph.D.

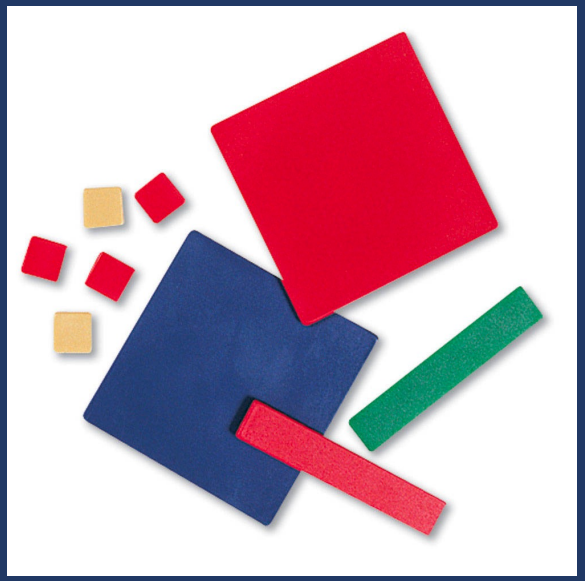
cups/plates and counters

Show...

Problem
x + 4
y – 6
2(x)

Copyright 2022 Sarah R. Powell, Ph.D.

algebra tiles



Show...

Problem
$x + 4$
$y - 6$
$2(x)$

Copyright 2022 Sarah R. Powell, Ph.D.

Algeblocks

Show...

Problem
x + 4
y – 6
2(x)

Copyright 2022 Sarah R. Powell, Ph.D.

zero pairs

-1 and 1 equal 0

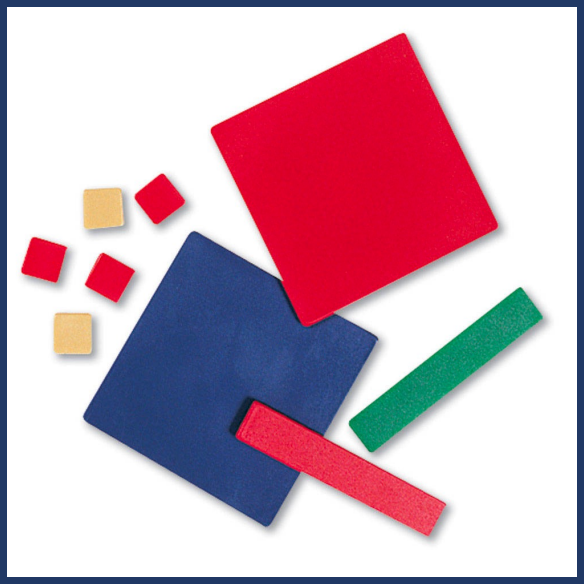
properties of equality

If you do something to one side of the equal sign, you do the same thing to the other side.

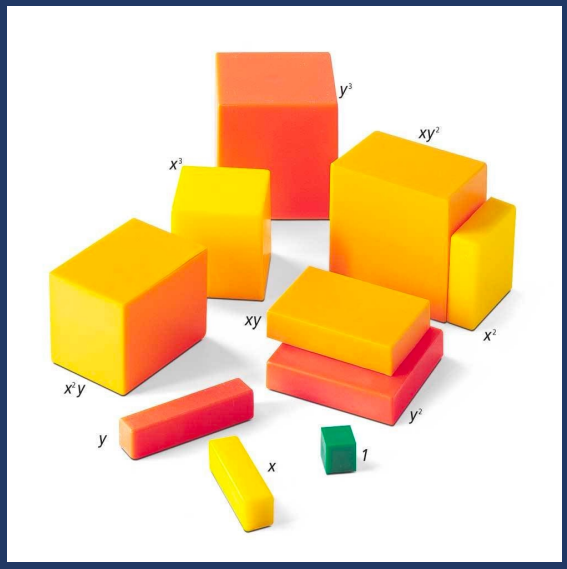
Copyright 2022 Sarah R. Powell, Ph.D.

cups/plates and counters

algebra tiles



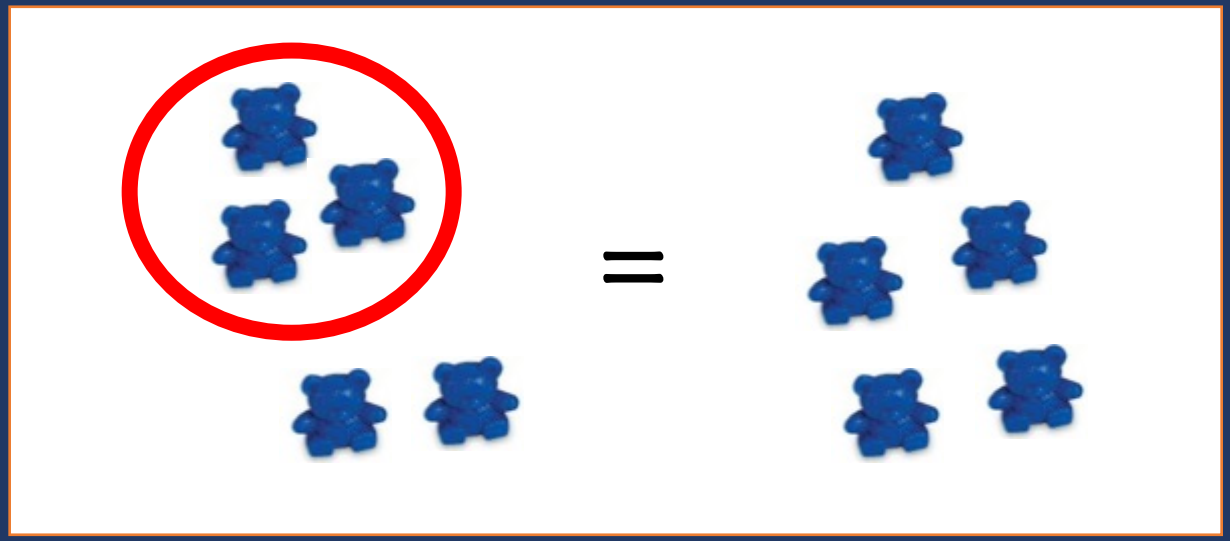
Algeblocks



Copyright 2022 Sarah R. Powell, Ph.D.

cups/plates and counters

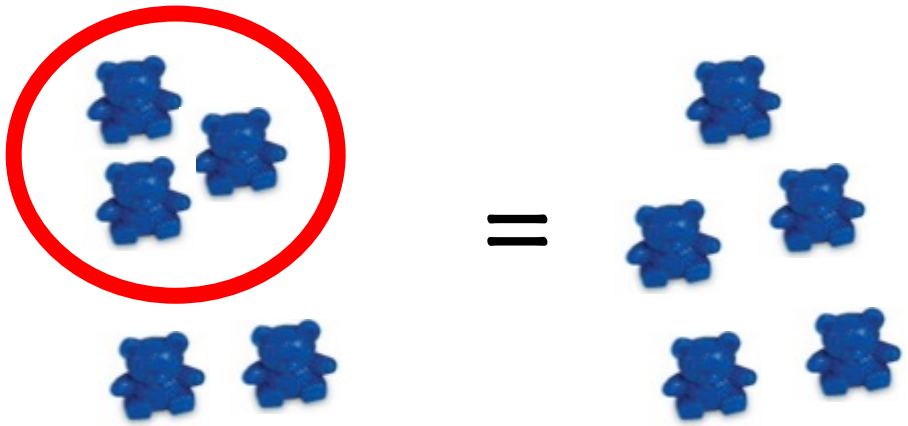
$x + 2 = 5$



Copyright 2022 Sarah R. Powell, Ph.D.

cups/plates and counters

$x + 2 = 5$



Copyright 2022 Sarah R. Powell, Ph.D.

Solving Equations
With Cups/Plates and Counters

Problem	Representations
$x + 2 = 5$	
$x + 2 = 5$	
$4 + x = 6$	
$5 = x - 3$	
$-2 = x + 3$	

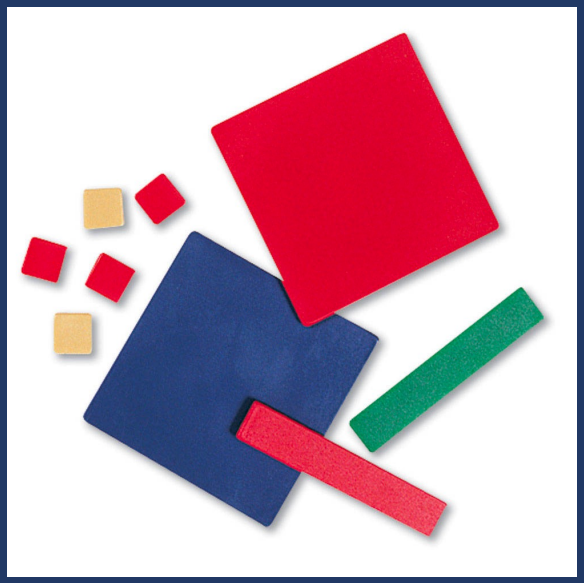
With Algebra Tiles

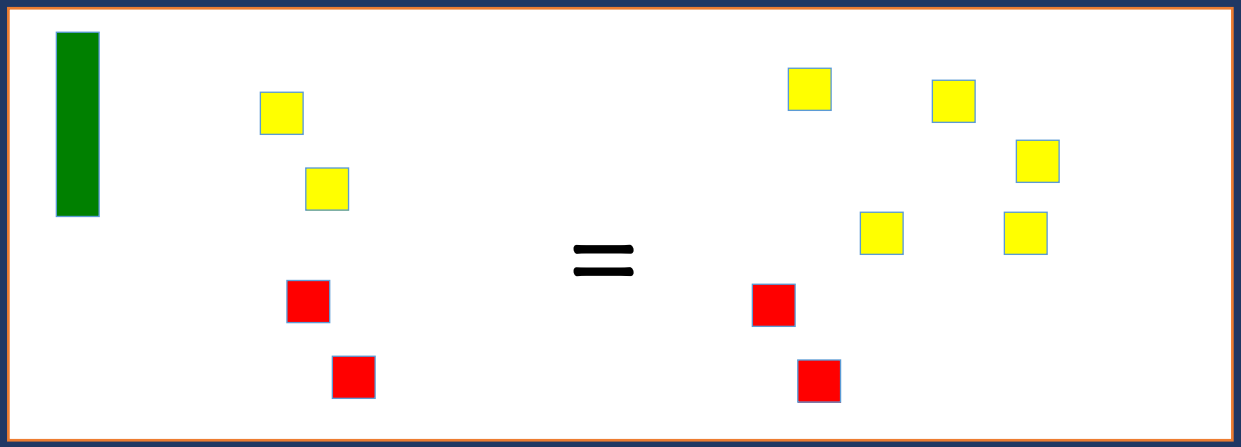
Problem	Representations
$x + 2 = 5$	
$4 + x = 6$ $x + 3 = 7$	
$y - 4 = 2$	
$5 = x - 3$ $y - 2 = 5$	

Copyright 2022 Sarah R. Powell, Ph.D.

algebra tiles

$x + 2 = 5$

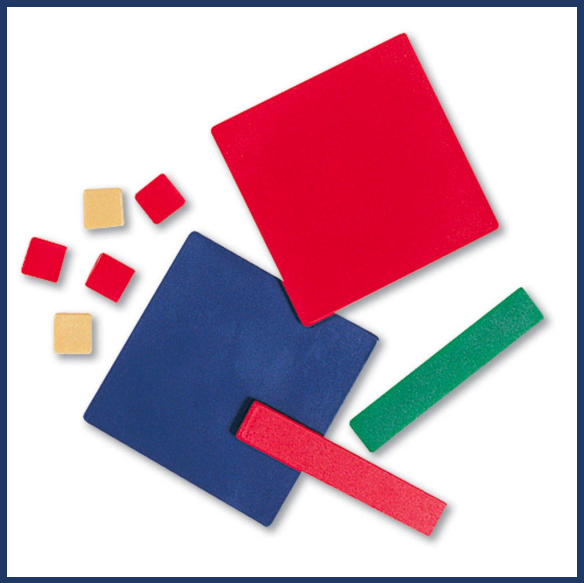


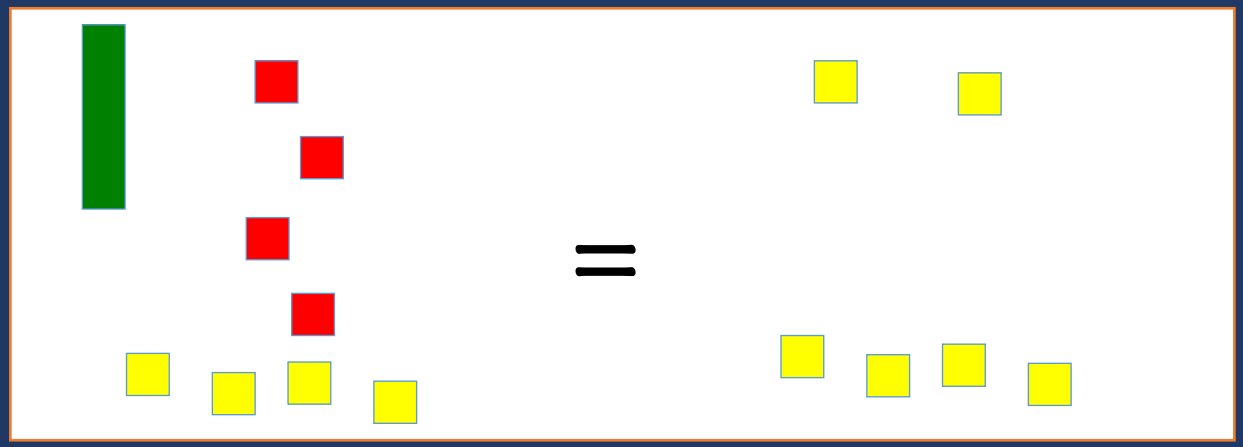


Copyright 2022 Sarah R. Powell, Ph.D.

algebra tiles

$y - 4 = 2$





Copyright 2022 Sarah R. Powell, Ph.D.

Solving Equations
With Cups/Plates and Counters

Problem	Representations
$x + 2 = 5$	
$x + 2 = 5$	
$4 + x = 6$	
$5 = x - 3$	
$-2 = x + 3$	

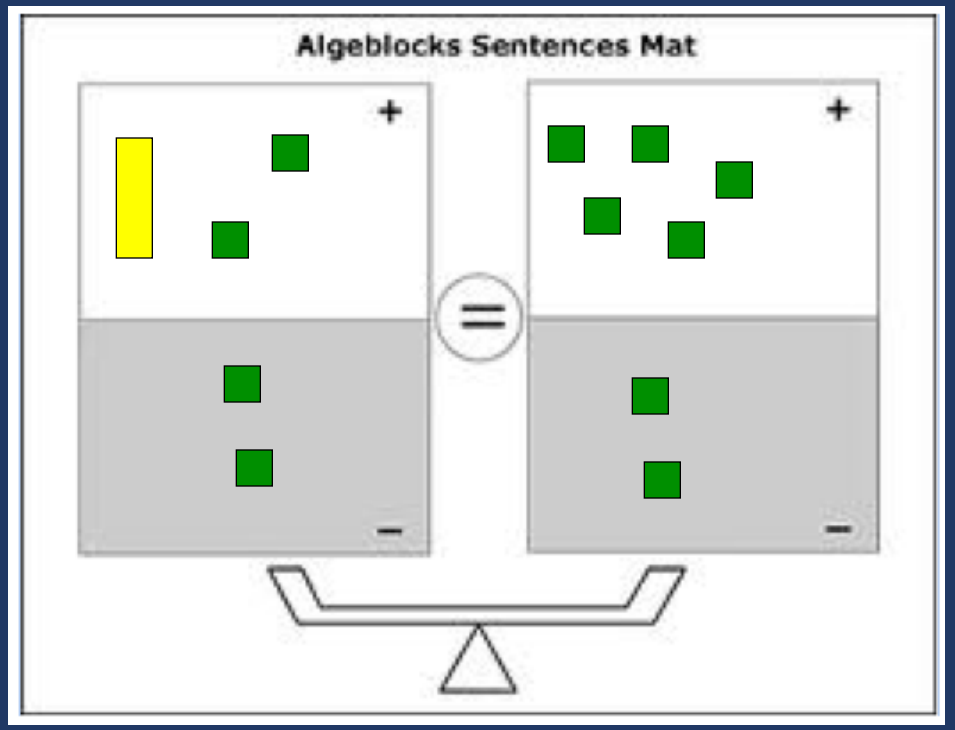
With Algebra Tiles

Problem	Representations
$x + 2 = 5$	
$4 + x = 6$ $x + 3 = 7$	
$y - 4 = 2$	
$5 = x - 3$ $y - 2 = 5$	

Copyright 2022 Sarah R. Powell, Ph.D.

Algeblocks

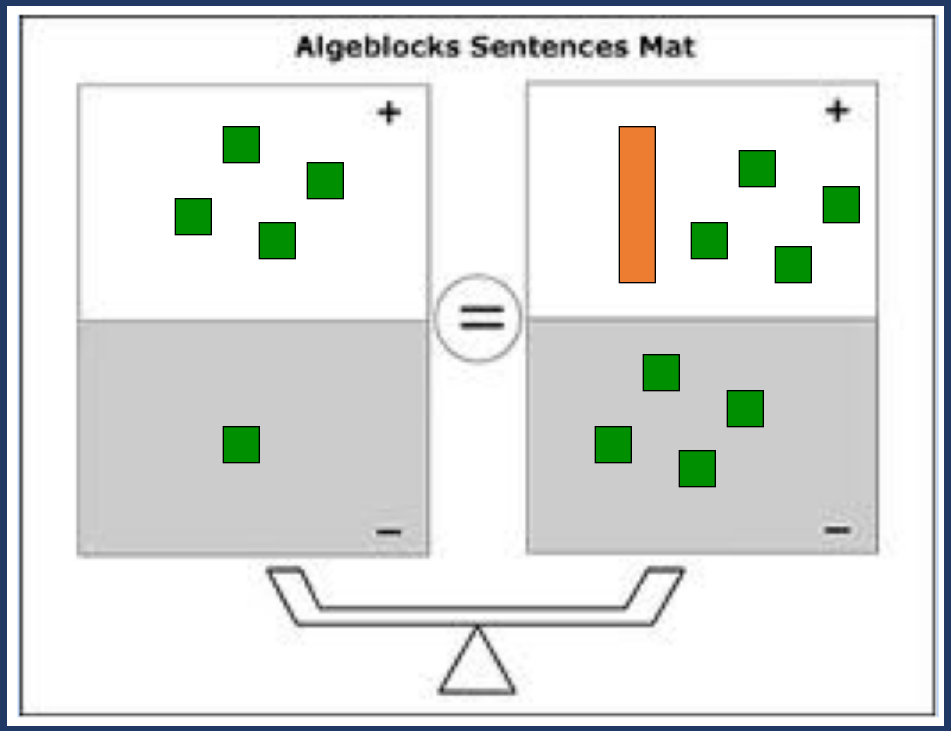
$x + 2 = 5$



Copyright 2022 Sarah R. Powell, Ph.D.

Algeblocks

$-1 = y - 4$



Copyright 2022 Sarah R. Powell, Ph.D.

Solving Equations

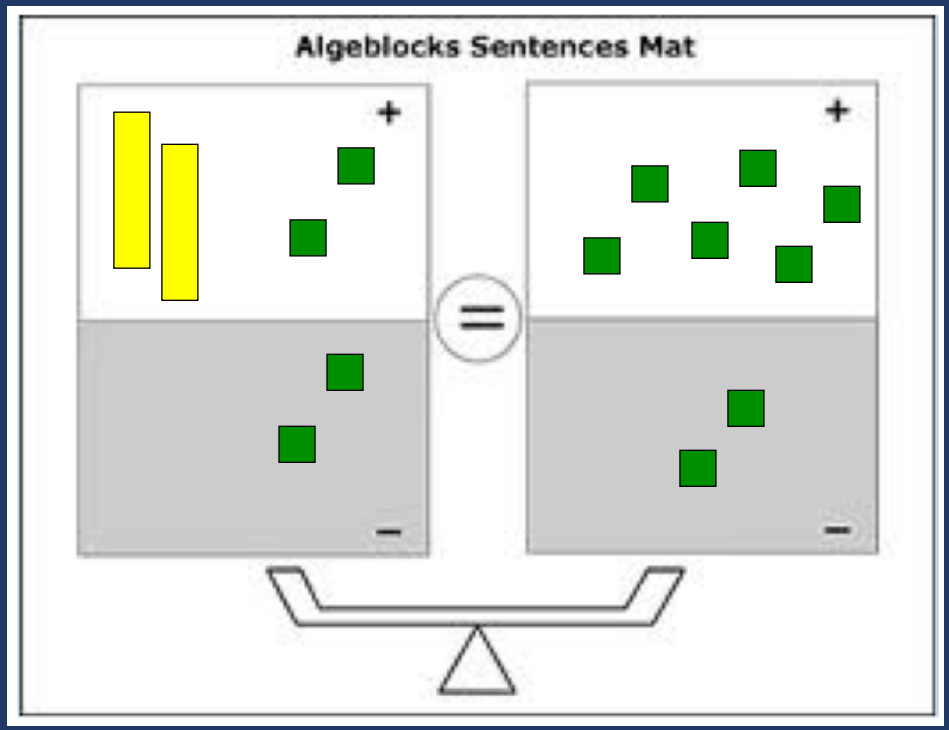
With Algeblocks

Problem	Representations
x + 2 = 5	
4 + x = 6	
-2 = x + 3	
-1 = y – 4	
2x + 2 = 6	
x + 4 = 3x	
2(x + 3) = x + 4	
2x – 4 = 1 + 3x	
3y – 5 = -y – 1	
1 – x = x + 1	

Copyright 2022 Sarah R. Powell, Ph.D.

Algeblocks

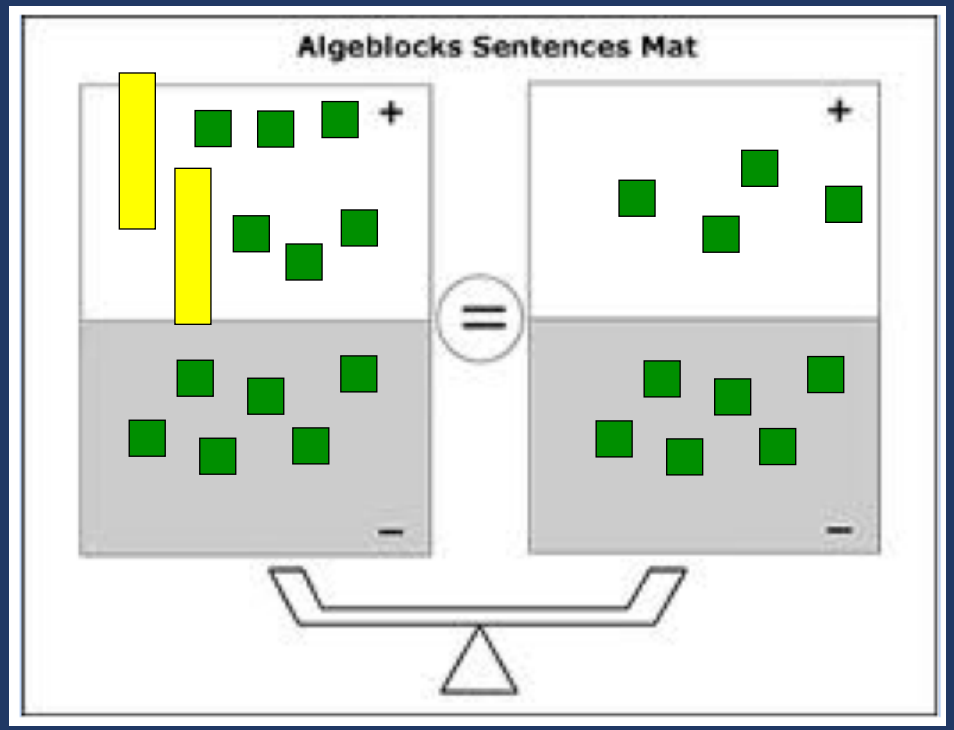
$2x + 2 = 6$



Copyright 2022 Sarah R. Powell, Ph.D.

Algeblocks

$$2(x + 3) = 4$$



Copyright 2022 Sarah R. Powell, Ph.D.

Solving Equations

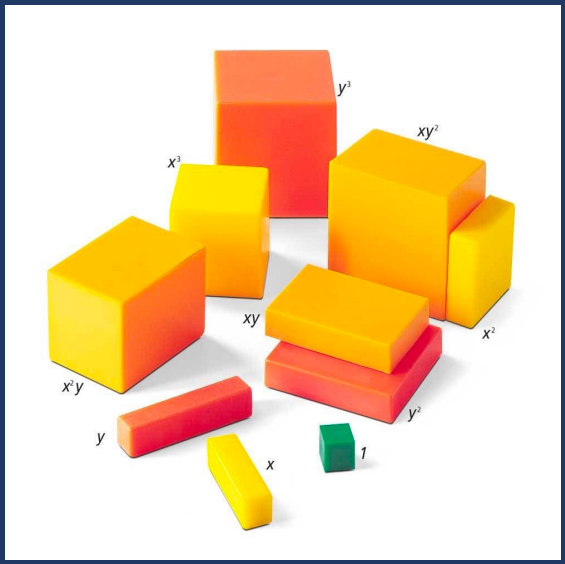
With Algeblocks

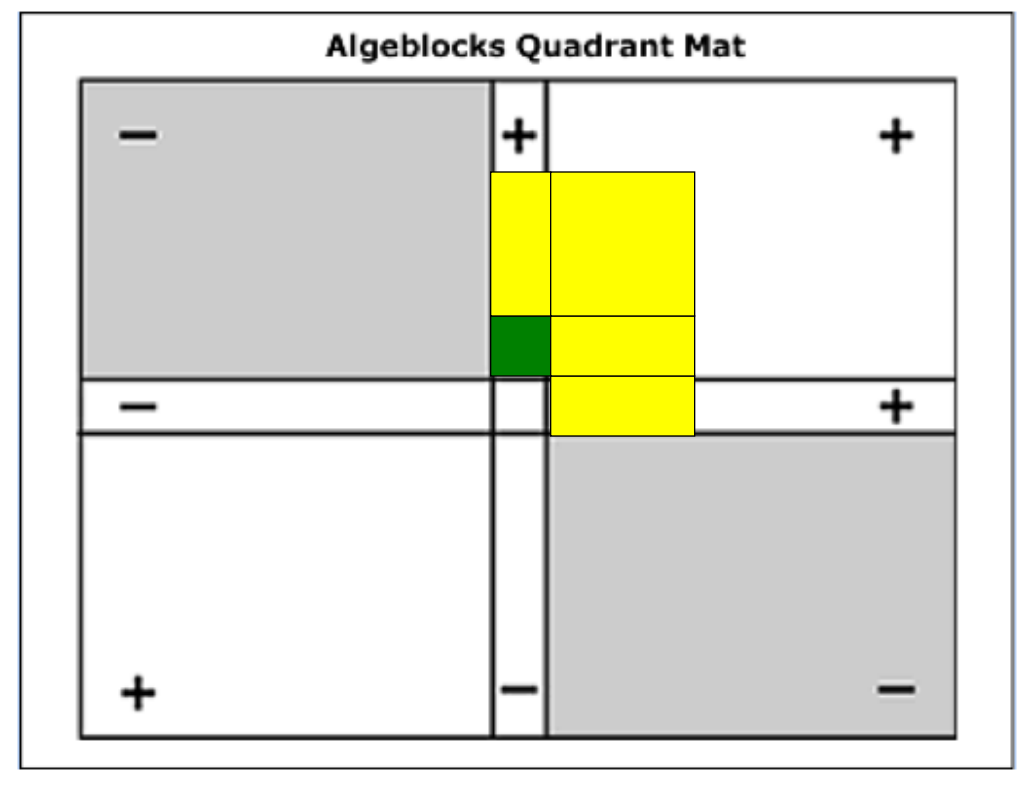
Problem	Representations
x + 2 = 5	
4 + x = 6	
-2 = x + 3	
-1 = y – 4	
2x + 2 = 6	
x + 4 = 3x	
2(x + 3) = x + 4	
2x – 4 = 1 + 3x	
3y – 5 = -y – 1	
1 – x = x + 1	

Copyright 2022 Sarah R. Powell, Ph.D.

Algeblocks

x(1 + x)

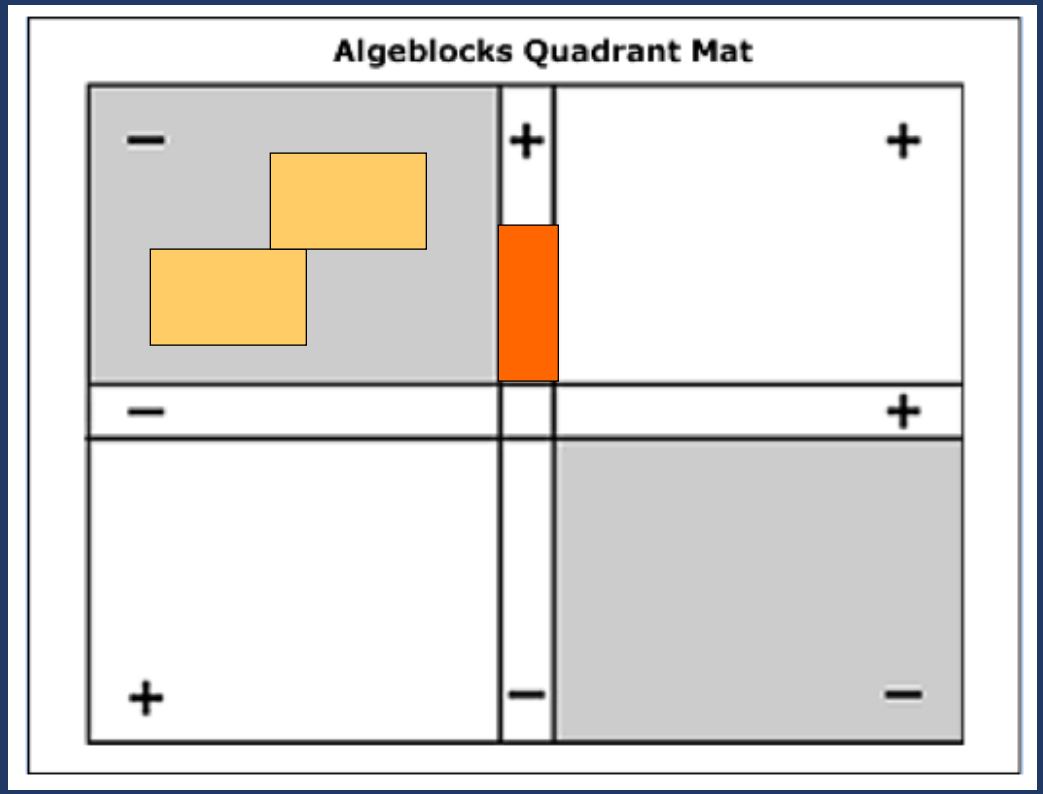




Copyright 2022 Sarah R. Powell, Ph.D.

Algeblocks

$-2xy \div y$



Copyright 2022 Sarah R. Powell, Ph.D.

Solving Equations

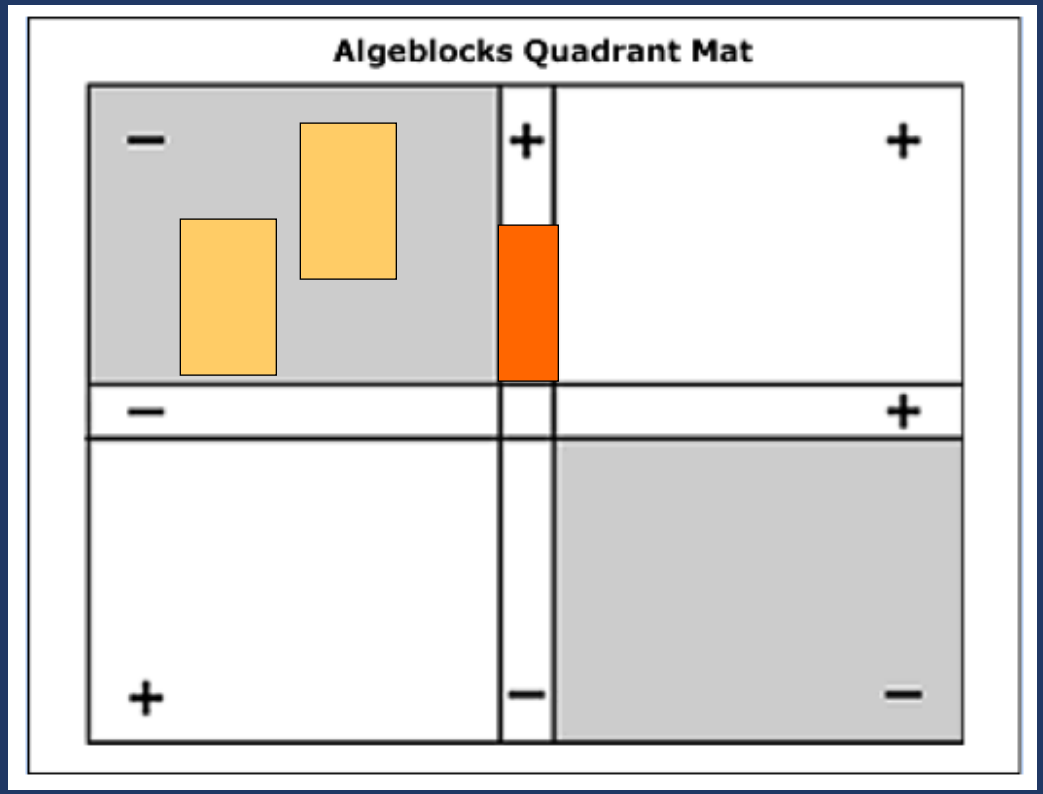
With Algeblocks

Problem	Representation
x(3)	
-2(y)	
x(1 + x)	
-y(y + 2)	
(x – 2)(-2x)	
(y – 1)(y + 2)	
3y ÷ 3	
-2xy ÷ y	
-3x ÷ 3x	
$4x^2 \div -x$	

Copyright 2022 Sarah R. Powell, Ph.D.

Algeblocks

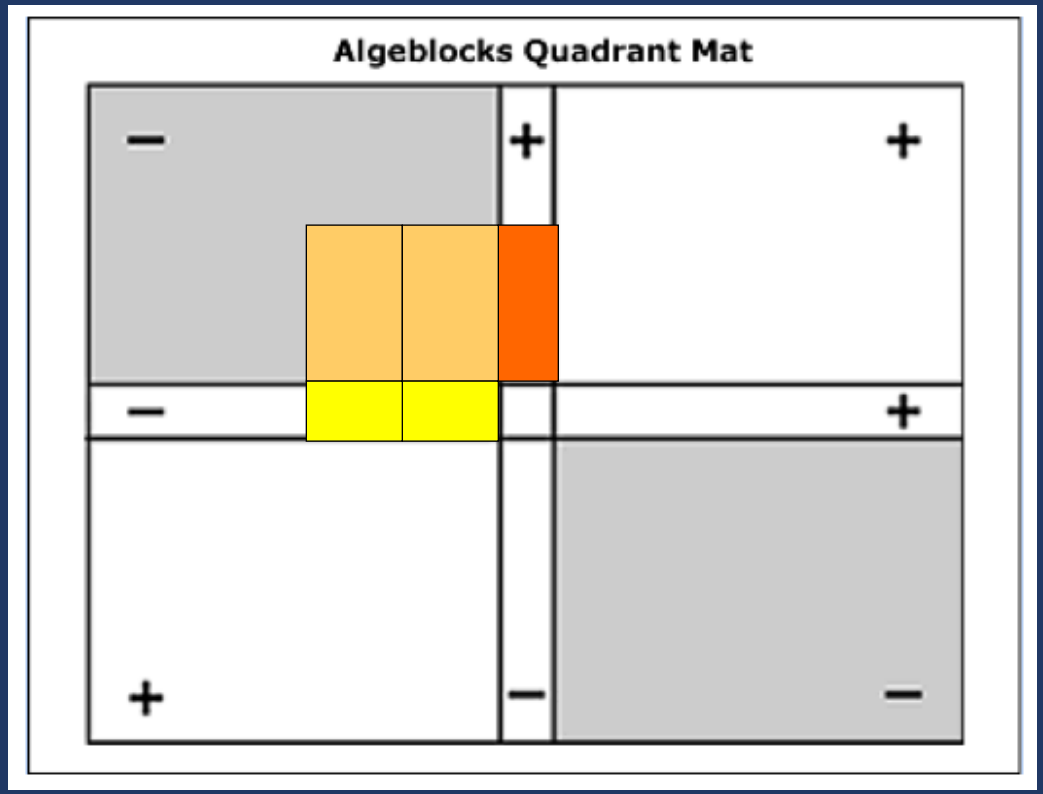
-2xy ÷ y



Copyright 2022 Sarah R. Powell, Ph.D.

Algeblocks

$-2xy \div y$



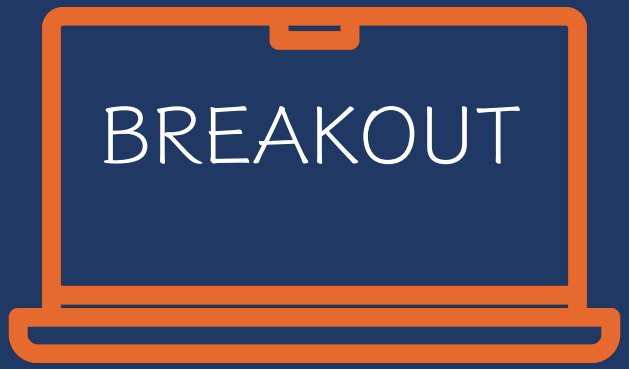
Copyright 2022 Sarah R. Powell, Ph.D.

Solving Equations

With Algeblocks

Problem	Representation
x(3)	
-2(y)	
x(1 + x)	
-y(y + 2)	
(x – 2)(-2x)	
(y – 1)(y + 2)	
3y ÷ 3	
-2xy ÷ y	
-3x ÷ 3x	
$4x^2 \div -x$	

Copyright 2022 Sarah R. Powell, Ph.D.



1. Share some of your favorite hands-on materials for algebra.
2. Share some of your favorite virtual manipulatives for algebra.
3. Considerations for using these tools with students?

Copyright 2022 Sarah R. Powell, Ph.D.

Sarah R. Powell, Ph.D.

Associate Professor
The University of Texas at Austin

www.sarahpowellphd.com

srpowell@utexas.edu

@sarahpowellphd

Copyright 2022 Sarah R. Powell, Ph.D.