Conceptual Learning Materials
Insights into Math Concepts
www.conceptuallearning.com

Sample 6-8 Packet

1. *Fraction Concepts
2. Fraction Line Instructions
3. *Decimal Introduction
4. Order Fractions
5. Fraction Operations
6. More Fraction Operations
7. Inequalities
8. *Number Theory
9. Order Decimals
10. Problem Solving E
11. *Mixed Practice E
12. *More Advanced Numeration
13. Decimal/Fraction Equivalence
14. Percent
15. Geometry Intermediate
16. *Advanced Decimals
17. *Advanced Geometry
18. Operations with Negatives
19. Order of Operations
20. Algebra Concepts
21. Algebraic Equations

- Free-response workpage for student use
  (slightly scaled-down to fit in packet)

6	7	8	www.conceptuallearning.com
			Fraction Concepts
			Decimal Introduction
			Rename
			Estimation
			Advanced Numeration
			Fraction Number Lines
			Sets (Cumulative)
			Order Fractions
			Fraction Operations
			More Fraction Operations
			Inequalities
			Number Theory
			Decimal Line & Labels
			Order Decimals
			Problem Solving E
			Mixed Practice E
			More Advanced Numeration
			Decimal Fraction Equivalence
			Percent
			Geometry Intermediate
			Advanced Decimals
			Advanced Geometry
			Intervals (Whole numbers)
			Intervals (Positive reals)
			Intervals (Integers)
			Intervals (All reals)
			Operations with Negatives
			Order of Operations
			Order Reals
			Algebra Concepts
			Algebraic Equations

Insights into Math Concepts focuses on concepts rather than on drill and calculations that are readily available from most educational suppliers. Typically, any classroom has students with a wide range of abilities and skill levels, so the levels include work that is on-level, reinforcement, and advanced for the respective grades. For example, the scope and sequence chart shows that "Operations with Negatives" would be challenging for sixth grade students, but on-level for seventh and eighth grades.

Note that the materials come in a variety of formats. All taskcards are available in colorful reusable cardstock, reproducible blackline masters, or more cost-effective digital downloads. Exercises that are manipulated come in colorful cardstock that is to be laminated and cut. Most are also available as a reproducible blackline workpage format and digital workpage PDF downloads as well.

Fraction Concepts (20 of 20)
(cardstock, reproducible blackline masters, & digital downloads)

Fraction Concepts is graphic full-page bridging material encompassing all basic fraction concepts: equivalency, comparisons, reducing, improper to mixed numbers, mixed to improper, renaming, fraction of a group, addition and subtraction of like fractions, basic multiplication and division of fraction by whole number, and word problems, and answer keys. It is available in all three formats.

Name_____ Date_____

1) In the fraction $\frac{2}{3}$, the denominator is _____ , and the numerator is _____ .

Proper (P), improper (I), or mixed number (MN)?

2) $\frac{4}{3}$ _____ 3) $\frac{3}{3}$ _____ 4) $\frac{2}{3}$ _____ 5) $1\frac{2}{3}$ _____

>, <, or = ?

6) $\frac{3}{5}$ ___ $\frac{2}{5}$ 7) $\frac{1}{2}$ ___ $\frac{2}{4}$ 8) $\frac{2}{3}$ ___ $\frac{3}{2}$ 9) $\frac{1}{8}$ ___ $\frac{1}{9}$

Simplify:

10) $\frac{3}{9}$ _____ 11) $\frac{5}{4}$ _____ 12) $2\frac{6}{8}$ _____ 13) $1\frac{4}{3}$ _____

Work the problems & simplify answers if possible. (*Hint, sometimes it helps to simplify first too.)

14) $\frac{8}{9} + \frac{2}{9}$ = _____   15) $\frac{8}{9} - \frac{2}{9}$ = _____

16) $5\frac{3}{4} + 2\frac{1}{4}$ = _____   17) $\frac{4}{15} + \frac{5}{15}$ = _____

18) $4\frac{3}{5} + 1\frac{3}{5}$ = _____   19) $5\frac{9}{10} - 1\frac{3}{10}$ = _____

20) $3\frac{3}{5} \times 3$ = _____   21) $12\frac{9}{10} \div 3$ = _____

22)* $3\frac{3}{5} + \frac{4}{4}$ = _____   23)* $3\frac{6}{7} + 2\frac{3}{3}$ = _____

24)** $1\frac{1}{3} + 5\frac{2}{5} + 2\frac{2}{3} + 1\frac{1}{5}$ = _____

25) Juan rode his bike $\frac{3}{4}$ mile. Since there are 1,760 yards in one mile, how many yards did he ride his bike? _____

Fraction Line and Tags

Purpose: to visualize the relationship between proper fractions, improper fractions, and mixed numbers and to acquire an intuitive understanding of their value.

Contents
- Ten color-coded fraction lines. For the most part, colors correspond to Montessori short-bead-stair colors. For example, halves correspond to the green "two" beads, thirds correspond to the pink "three" beads, and so on.
- Two identical sheets of ivory tags that include un-simplified proper and improper fractions (one sheet is to use, and the second is for spare parts).
- Two identical sheets of white tags representing simplified and mixed-number versions that correspond to the respective ivory tags (again, one sheet is for use, and the second set is for spare parts).

Preparation of lines: Laminate the colored lines as well as the four pages of labels before cutting. Cut each set of colored lines along the dashed lines. Butt the four sections end-to-end and secure on both the front and back with clear packing tape. Trim the tape so it is even with the rest of the line. You will have created lines that are each four units long and subdivided into various fractional parts. If desired, you may fold "accordion-style" and place all fraction lines together in a 3 x 9 organizer for storage.

Secure with clear packing tape
on front & back and then
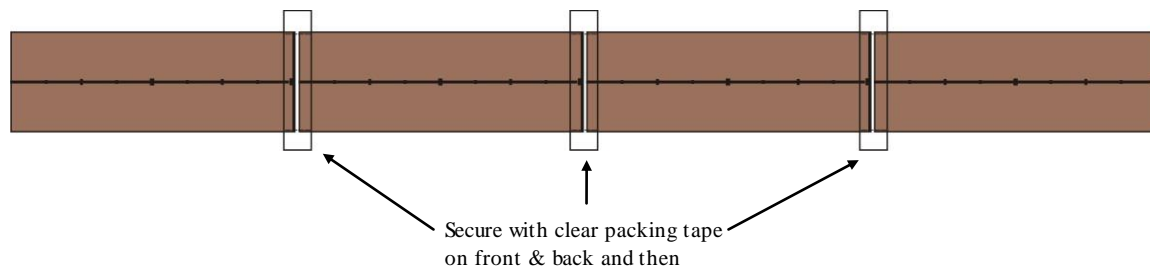
Preparation of tags: The four pages of tags should be laminated before cutting. Set one page of ivory tags and one page of white tags aside and save for future replacement parts.

Systematically cut the "half" tags on the ivory sheet and the "half" tags on the white sheet and store them in the same hardware drawer, box, or zip-lock envelope. The "half" tags are all designated with the letter "a" on the edge. Systematically do the same for thirds (b), fourths (c), fifths (d), and so one. When you have finished, you will have eleven different containers, each with about 10 ivory tags and 10 white tags. You may label the containers with the appropriate adhesive label which was included in your set.

Presentation: The child uses a specific number line with the appropriate tags. For examples, the "halves" number line is green, and it goes with the "halves" tags in the container with the letter "a". Each number line is intended for a specific fractional part and is used with corresponding tags.

It is recommended that younger students progress through the set sequentially until it becomes challenging. Older children may relate to their previous knowledge of equivalent fractions.

The child opens the appropriate line and places it on a table or rug. He or she places the ivory tags along the top of the line (Option 1). The next phase would be to start with the ivory tags on the top and immediately place the white tags in the corresponding position along the bottom (Option 2); this phase can be valuable in discovering the relationship of the two versions. The final and most abstract phase is placement of the white tags first (Option 3). For this phase the ivory tags may be used as a control to self-check the work.
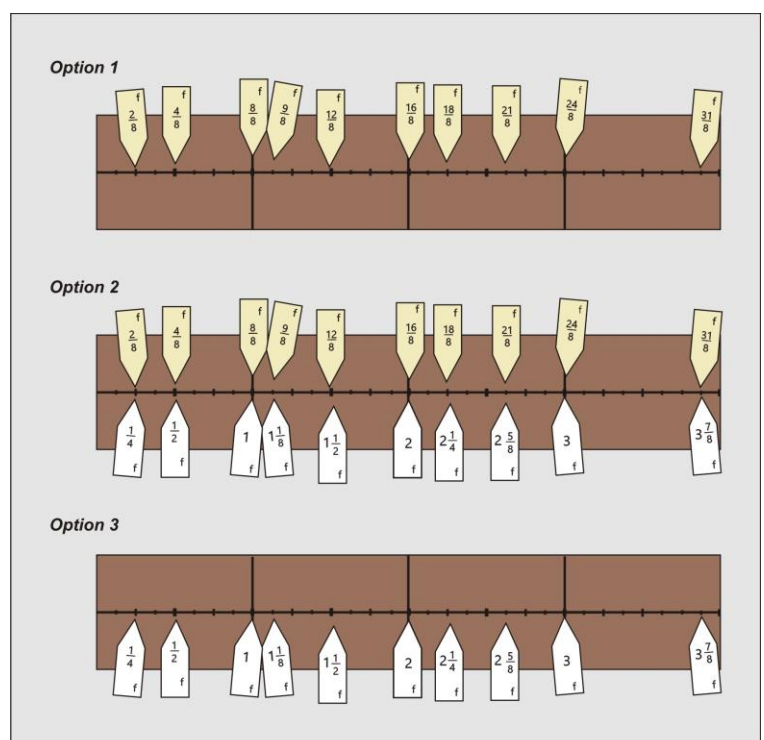
Decimal Introduction (20 of 20)
(cardstock, reproducible blackline masters, & digital downloads)

Decimal Introduction is full-page taskcard set encompassing two- and three-place decimals. The sample depicts the cumulative exercise for the entire set, with each of the included skills addressed in an earlier page. All taskcard series are available in all three formats.

Name_____ Date_____

In 24.18

1) **What digit is in the tenths' place?** _____
2) **What digit is in the tens' place?**

Change to a decimal

3) $\frac{5}{10}$ = _____

4) $3\frac{14}{100}$ = _____

5) $9\frac{3}{100}$ = _____

6) $3\frac{6}{10}$ = _____

7) $17\frac{32}{100}$ = _____

Change to a fraction

8) 3.3 = _____

9) 4.67 = _____

10) 19.07 = _____

11) **Round 23.46 to nearest tenth** _____

12) **Round 165.51 to nearest whole** _____

Work the following problems:
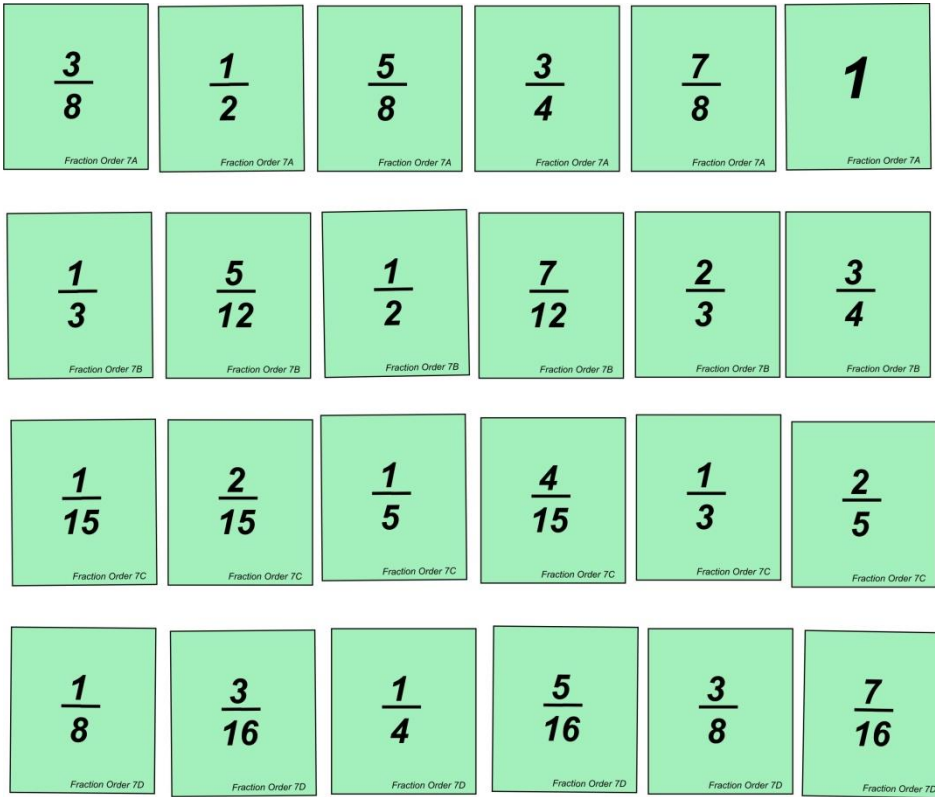
13) 4.65 + 0 .2 = _____

14) 5.86 - 3 = _____

15) 2.4 x 7 = _____

16) 2.84 ÷ 4 = _____

17) $5 - $2.46 = _____

18) 3.5 x 3 = _____

Introduction to Decimals 20

$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
Fraction Order 7A	Fraction Order 7A	Fraction Order 7A	Fraction Order 7A	Fraction Order 7A	Fraction Order 7A

$\frac{1}{3}$	$\frac{5}{12}$	$\frac{1}{2}$	$\frac{7}{12}$	$\frac{2}{3}$	$\frac{3}{4}$
Fraction Order 7B	Fraction Order 7B	Fraction Order 7B	Fraction Order 7B	Fraction Order 7B	Fraction Order 7B

$\frac{1}{15}$	$\frac{2}{15}$	$\frac{1}{5}$	$\frac{4}{15}$	$\frac{1}{3}$	$\frac{2}{5}$
Fraction Order 7C	Fraction Order 7C	Fraction Order 7C	Fraction Order 7C	Fraction Order 7C	Fraction Order 7C

$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$
Fraction Order 7D	Fraction Order 7D	Fraction Order 7D	Fraction Order 7D	Fraction Order 7D	Fraction Order 7D

Fraction sequencing cards are four separate sequences of six fractional values ordered from least to greatest: like denominators, like and unlike fractions, improper fractions, and mixed numbers. Initially students can use fraction manipulatives or charts as aids, but when ready to abstract they can rely on the intuition gained through hands-on work or through finding common denominators. Incremented by level of difficulty, the set includes 10 separate exercises – each printed on a separate sheet. Organizational labels for containers and answer keys are included. All manipulative cardstock work requires lamination and cutting.

Fraction Order reproducible masters and digital downloads have the same problems as the matching cards, but come in a free-response worksheet format on which children record their own answers.

Name_____   Date_____

Student is to select appropriate fraction (left of each row) to sequence fractions from least to greatest.

$\frac{3}{4}$ $\frac{7}{8}$ $\frac{1}{2}$ $\frac{5}{8}$	$\frac{3}{8}$				1
	Fraction Order 7A	Fraction Order 7A	Fraction Order 7A	Fraction Order 7A	Fraction Order 7A / Fraction Order 7A
$\frac{1}{2}$ $\frac{1}{3}$ $\frac{7}{12}$ $\frac{5}{12}$				$\frac{2}{3}$	$\frac{3}{4}$
	Fraction Order 7B	Fraction Order 7B	Fraction Order 7B	Fraction Order 7B	Fraction Order 7B / Fraction Order 7B
$\frac{2}{15}$ $\frac{2}{5}$ $\frac{1}{15}$ $\frac{1}{3}$			$\frac{1}{5}$	$\frac{4}{15}$	
	Fraction Order 7C	Fraction Order 7C	Fraction Order 7C	Fraction Order 7C	Fraction Order 7C / Fraction Order 7C
$\frac{5}{16}$ $\frac{3}{16}$ $\frac{1}{4}$	$\frac{1}{8}$			$\frac{3}{8}$	$\frac{7}{16}$
	Fraction Order 7D	Fraction Order 7D	Fraction Order 7D	Fraction Order 7D	Fraction Order 7D / Fraction Order 7D

Fraction Operations
(cardstock, reproducible blackline masters, & digital downloads)

Fraction Operations is a step-by-step 13-exercise series focusing on addition and subtraction of unlike fractions: equivalent fractions, common denominators, unlike proper fractions, unlike mixed numbers, regrouping of fractional minuends, multi-step subtraction requiring common denominators and regrouping, cumulative review, and answer key. All taskcards are available in all three formats.

Fraction Operations 5

Name_____ Date_____

1) $\frac{1}{3} = \frac{2}{6}$
   $+ \frac{1}{2} = \frac{3}{6}$
   $\frac{5}{6}$

2) $\frac{2}{3} = \frac{}{12}$
   $- \frac{1}{4} = \frac{}{12}$

3) $\frac{3}{8} = \frac{}{24}$
   $+ \frac{5}{6} = \frac{}{24}$

4) $\frac{5}{12} = \frac{}{24}$
   $+ \frac{3}{8} = \frac{}{24}$

5) $\frac{5}{8} = \frac{}{40}$
   $- \frac{2}{5} = \frac{}{40}$

6) $\frac{9}{10} = \frac{}{30}$
   $- \frac{2}{3} = \frac{}{30}$

7) $\frac{3}{4} = \frac{}{12}$
   $- \frac{1}{3} = \frac{}{12}$

8) $\frac{9}{10} = \frac{}{20}$
   $+ \frac{3}{4} = \frac{}{20}$

9) $\frac{4}{5} = \frac{}{10}$
   $+ \frac{1}{2} = \frac{}{10}$

10) $\frac{2}{3} = \frac{}{12}$
    $+ \frac{1}{4} = \frac{}{12}$

11) $\frac{5}{6} = \frac{}{12}$
    $- \frac{3}{4} = \frac{}{12}$

12) $\frac{7}{10} = \frac{}{30}$
    $- \frac{1}{3} = \frac{}{30}$

13) $\frac{7}{8} = \frac{}{24}$
    $- \frac{5}{6} = \frac{}{24}$

14) $\frac{5}{12} = \frac{}{24}$
    $+ \frac{3}{8} = \frac{}{24}$

15) $\frac{2}{9} = \frac{}{18}$
    $+ \frac{5}{6} = \frac{}{18}$

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Fraction Operations 8

Name_____ Date_____

1) $5 = 4\frac{2}{2}$
   $- \frac{1}{2} = \frac{1}{2}$
   $4\frac{1}{2}$

2) $9 = 8\frac{\square}{4}$
   $- \frac{3}{4} = \frac{3}{4}$

3) $7 = 6\frac{\square}{10}$
   $- \frac{9}{10} = \frac{9}{10}$

4) $4 = 3\frac{\square}{\square}$
   $- 3\frac{1}{8} = 3\frac{1}{8}$

5) $6 = \square\frac{\square}{\square}$
   $- 2\frac{3}{7} = 2\frac{3}{7}$

6) $9 = \square\frac{\square}{\square}$
   $- 5\frac{6}{7} = 5\frac{6}{7}$

7) $12 =$
   $- 4\frac{11}{12} =$

8) $8 =$
   $- 6\frac{9}{10} =$

9) $10 =$
   $- 1\frac{13}{15} =$

10) $1 =$
    $- \frac{9}{10} =$

11) $3 =$
    $- 1\frac{5}{6} =$

12) $18 =$
    $- 9\frac{1}{2} =$

13) $34 =$
    $- 12\frac{2}{5} =$

14) $82 =$
    $- 14\frac{6}{7} =$

15) $100 =$
    $- 39\frac{5}{9} =$

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Fraction Operations 13

Name_____ Date_____

1) $3\frac{3}{4} = 3\frac{3}{4}$
   $+ 2\frac{1}{2} = 2\frac{2}{4}$
   $5\frac{5}{4} = 6\frac{1}{4}$

2) $8 =$
   $+ 2\frac{3}{4} =$

3) $9\frac{1}{2} =$
   $- 3\frac{1}{4} =$

4) 4
   $- 1\frac{3}{4}$

5) $7\frac{3}{4}$
   $+ 2\frac{2}{3}$

6) $8\frac{11}{12}$
   $- 4\frac{1}{3}$

7) $3\frac{2}{3}$
   $+ 8\frac{7}{8}$

8) $7\frac{5}{12}$
   $- 1\frac{7}{12}$

9) $9\frac{3}{4}$
   $+ 7\frac{5}{6}$

10) $7 + 3\frac{1}{5} + 6\frac{3}{4}$

11) $9 + 4\frac{3}{4}$

12) $7\frac{1}{4} - 3\frac{5}{6}$

13) $5\frac{3}{4} + 2\frac{1}{4} + 3\frac{3}{8}$

14) $5 - 1\frac{3}{4}$

15) $7\frac{1}{3} - 4\frac{2}{3}$

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More Fraction Operations
(cardstock, reproducible blackline masters, & digital downloads)

More Fraction Operations is an illustrated, step-by-step 20-exercise series focusing on multiplication & division of fractions, whole numbers, and mixed numbers. After practice with initial presentations, shortcuts such as cancelling are also presented. Multiplication and division are presented in vertical steps much as algebra is. More Fraction Operations 18 is a cumulative review of all multiplication & division of fractions, while 19 and 20 are cumulative reviews of all four fraction operations. All taskcards & answers are available in all three formats.rs..

Card 1 — More Fraction Operations 3

Name_____   Date_____

1) $\frac{1}{3}$ of $\frac{1}{6} = \frac{1}{18}$ 6) $\frac{1}{3} \times \frac{2}{3} =$ ☐

2) $\frac{1}{4} \times \frac{3}{4} =$ ☐   7) $\frac{1}{6} \times \frac{5}{6} =$ ☐

3) $\frac{1}{3} \times \frac{2}{5} =$ ☐   8) $\frac{4}{5} \times \frac{2}{3} =$ ☐

4) $\frac{1}{9} \times \frac{2}{5} =$ ☐   9) $\frac{3}{4} \times \frac{1}{2} =$ ☐

5) $\frac{3}{8} \times \frac{1}{2} =$ ☐   10) $\frac{1}{9} \times \frac{2}{3} =$ ☐

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Card 2 — More Fraction Operations 13

Name_____   Date_____

A reciprocal is the fraction that gives a product of one.

$\frac{3}{4} \times \frac{4}{3} = \frac{12}{12} = 1$	$8 = \frac{8}{1}$ $\frac{8}{1} \times \frac{1}{8} = \frac{8}{8} = 1$	$1\frac{3}{4} = \frac{7}{4}$ $\frac{7}{4} \times \frac{4}{7} = \frac{28}{28} = 1$

Find the reciprocal

1) $\frac{1}{2}$ _____   9) $3\frac{2}{9}$ _____

2) $\frac{1}{8}$ _____   10) $6\frac{1}{5}$ _____

3) 3 _____   11) $2\frac{3}{4}$ _____

4) $6\frac{1}{3}$ _____   12) $6\frac{4}{5}$ _____

13) $2\frac{4}{5}$ _____

14) $1\frac{5}{6}$ _____

15) $1\frac{1}{3}$ _____

16) $7\frac{1}{2}$ _____

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Card 3 — More Fraction Operations 18

_____   Date_____

1) 3 $\frac{1}{2} =$ _____   8) $2\frac{1}{2} \times 3 =$ _____

2) $\frac{1}{2} \div 3\frac{1}{2} =$ _____   9) $5 \div 1\frac{1}{2} =$ _____

3) $6 \times \frac{5}{6} =$ _____   10) $5 \times 1\frac{1}{2} =$ _____

4) $6 \div \frac{5}{6} =$ _____   11) $2\frac{1}{4} \div 4\frac{1}{2} =$ _____

5) $3\frac{1}{4} \div 4 =$ _____   12) $3\frac{1}{5} \times 10 =$ _____

6) $3\frac{1}{4} \times 4 =$ _____   13) $7\frac{1}{2} \div 7\frac{1}{2} =$ _____

7) $2\frac{1}{2} \div 3 =$ _____   14) $3\frac{1}{3} \times 2\frac{1}{4} =$ _____

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Inequalities

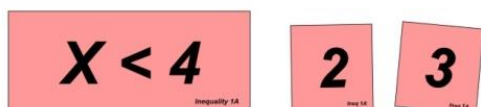*Developing logic and critical thinking skills, Inequalities is a comfortable introduction to basic algebraic notation. Algebraic representations of open and closed intervals are solved by selecting solution cards from a given replacement set. The series introduces variables as well as the relationship symbols >, ≥, <, and ≤ . Inequalities in printed in black ink on salmon cardstock and includes a paper answer key. There are 15 separate exercises, each with six problems. The cardstock manipulative exercise requires lamination and cutting. Organizational labels for containers are included.*

Put the cards that solve the inequality next to it.

Put cards from the replacement set that do not solve the inequality to the side.

"A" cards → | X < 4 | 2 | 3 | | 4 | 5 | 6 | 7
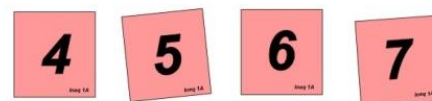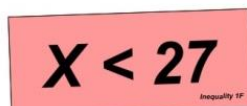
"B" cards → | X < 9 | 7 | 8 | | 9 | 10 | 11 | 12

"C" cards → | X < 22 | 18 | 19 | 20 | 21 | | 22 | 23

"D" cards → | X < 10 | 6 | 7 | 8 | 9 | | 10 | 11

"E" cards → | X < 16 | 11 | 12 | 13 | 14 | 15 | | 16

"F" cards → | X < 27 | | 27 | 28 | 29 | 30 | 31 | 32

Number Theory is a 20-exercise free-response taskcard series that includes prime and composite numbers, laws of divisibility, factors, prime factors, greatest common factor, multiples, least common multiple, exponents, simple radicals, and answer keys. All tasckcards are available in all three formats.

Name _____   Date _____

1) **Prime factors of 36** $2^2 x\, 3^2$

2) **Prime factors of 48**   _____

3) **Prime factors of 12**   _____

4) **Prime factors of 49**   _____

5) **Prime factors of 75**   _____

6) **Prime factors of 32**   _____

7) **Prime factors of 56**   _____

8) **Prime factors of 84**   _____

9) **Prime factors of 90**   _____

10) **Prime factors of 96**   _____

11) **Prime factors of 144**   _____

12) **Prime factors of 125**   _____

13) **Prime factors of 99**   _____

14) **Prime factors of 112**   _____

15) **Prime factors of 120**   _____

16) **Prime factors of 128**   _____

17) **Prime factors of 200**   _____

18) **Prime factors of 164**   _____

19) **Prime factors of 150**   _____

20) **Prime factors of 16**   _____

Number Theory 12

0.001	0.01	0.1	1	10	100
Decimal Order 6A	Decimal Order 6A	Decimal Order 6A	Decimal Order 6A	Decimal Order 6A	Decimal Order 6A
.005	.05	.5	5	50	500
Decimal Order 6B	Decimal Order 6B	Decimal Order 6B	Decimal Order 6B	Decimal Order 6B	Decimal Order 6B
0.032	0.32	3.2	32	320	3200
Decimal Order 6C	Decimal Order 6C	Decimal Order 6C	Decimal Order 6C	Decimal Order 6C	Decimal Order 6C
.513	5.13	51.3	513	5130	51300
Decimal Order 6D	Decimal Order 6D	Decimal Order 6D	Decimal Order 6D	Decimal Order 6D	Decimal Order 6D

Decimal sequencing cards are four separate sequences of six decimal values ordered from least to greatest. Incremented by level of difficulty, the set includes 10 separate exercises – each printed on a separate sheet. Organizational labels for containers and answer keys are included. All manipulative cardstock work requires lamination and cutting.

Decimal Order reproducible masters have the same problems as the matching cards, but come in a free-response worksheet format on which children record their own answers. Decimal Order workpage digital downloads will be available in fall of 2019.

Name_____   Date_____

Student is to select appropriate decimal (left of each row) to sequence numbers from least to greatest.
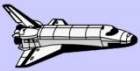
	0.001	0.01				100
10 / 1 / 0.1	Decimal Order 6A	Decimal Order 6A	Decimal Order 6A	Decimal Order 6A	Decimal Order 6A	Decimal Order 6A
.5 / 50 / .05	.005			5		500
	Decimal Order 6B	Decimal Order 6B	Decimal Order 6B	Decimal Order 6B	Decimal Order 6B	Decimal Order 6B
3200 / 0.032 / 320		0.32	3.2	32		
	Decimal Order 6C	Decimal Order 6C	Decimal Order 6C	Decimal Order 6C	Decimal Order 6C	Decimal Order 6C
51.3 / 5.13 / 5130	.513			513		51300
	Decimal Order 6D	Decimal Order 6D	Decimal Order 6D	Decimal Order 6D	Decimal Order 6D	Decimal Order 6D
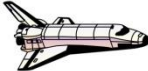
Problem Solving Match
Levels A, B, C, D, and E

1st		2nd	3rd
(airplane image) Problems E16		Plane flies 1554 miles from Houston to Los Angeles in 3 hours What is its cruising speed? Problems E16	552 miles per hour Problems E16
(space shuttle image) Problems E16		Shuttle flies 18,000 miles per hour. How far does it fly in a second? Problems E16	5 miles Problems E16
(bird image) Problems E16		It flies 48 miles from Houston to Galveston in 3 hours. What is its cruising speed? Problems E16	16 mph Problems E16
(train image) New York 210 miles Problems E16		Acela travels from Boston to New York in 3 hrs. How many miles does it average per hour? Problems E16	70 miles Problems E16
(motorcycle image) 45 miles per gal Problems E16		Motorcycle has 6.3 gallon tank. How far does it travel on one tank? Problems E16	283.5 miles Problems E16
(boat image) Problems E16		Boat travels 36 mph for two hours. How far does it go? Problems E16	72 miles Problems E16
(bus image) Speed limit 60 mph Problems E16		How long does it take for bus to travel 200 miles from Houston to San Antonio? Problems E16	$3\frac{1}{3}$ hours Problems E16
(race car image) 143 MPH Problems E16		How long does it take to complete 500-mile Indianapolis race? Problems E16	3.5 hours Problems E16

Problem Solving Matching cards are printed with black ink on colored cardstock. The "1st card" can be placed in any order, but the "2nd" and "3rd" cards must be placed with the appropriate question cards. Level E in printed on lavender cardstock which is to be laminated and cut. Problem Solving E has 20 exercises, an answer key, and organization labels for containers.

Problem Solving reproducible masters come in a free-response worksheet format on which children record their own answers. Reproducible blacklines come in black ink on white paper, but digital downloads which will be available in fall 2019 may be printed either in black and white or in color depending on the user's printer.

Name_____		Date_____
1st *(airplane)* Problems E16	2nd Plane It flies 1554 miles from Houston to Los Angeles in 3 hours. What is its cruising speed?	3rd 552 miles per hour
1st *(space shuttle)* Problems E16	2nd Shuttle flies 18,000 miles per hour. How far does it fly in a second?	3rd
1st *(bird)* Problems E16	2nd It flies 48 miles from Houston to Galveston in 3 hours. What is its cruising speed?	3rd
1st *(train)* New York 210 miles Problems E16	2nd Acela travels from Boston to New York in 3 hrs. How many miles does it average per hour?	3rd
1st 45 miles per gal *(motorcycle)* Problems E16	2nd Motorcycle has 6.3 gallon tank. How far does it travel on one tank?	3rd
1st *(boat)* Problems E16	2nd Boat travels 36 mph for two hours. How far does it go?	3rd
1st Speed limit 60 mph *(bus)* Problems E16	2nd How long does it take for bus to travel 200 miles from Houston to San Antonio?	3rd
1st 143 MPH *(race car)* Problems E16	2nd How long does it take to complete 500-mile Indianapolis race?	3rd

Mixed Practice
A, B, C, D, & E

Incremental overview of all level-appropriate skills. Great as diagnostic assessment or as cumulative review.

Mixed Practice D & E each have 20 half-page task-cards.

All taskcards are available in colorful cardstock, reproducible blackline masters, or digital PDF downloads.

Name_____

1) In 643.078, what digit is in the ten's place? _____

2) Round 7.68 to the nearest tenth _____

3) Write the fraction equivalent of 0.58 _____

4) 2, 6, 5, 15, 14, 42, 41, _____

5) .023 _____ .0032   0.002 _____ 0.0002
         > < or =   > < or =

6) What is the freezing point of water in both Fahrenheit and Celsius? _____   _____

7) When it is 10:00 in Texas, What time is it in Florida?

   _____

8) Comfortable room temperature is

   _____
   6°C   10°C   32°F   22°C

9) 18 cm = _____ mm

10) 8.23 - .9 = _____

11)   4.21
     x   .2
     _____

12) $.2\overline{)8.86}$

13) What fraction represents the shaded portion? _____

14) What decimal represents the shaded portion? _____

Insights Into Math Concepts   *www.conceptuallearning.com*

More Advanced Numeration
(cardstock, reproducible blackline masters, & digital downloads)

More Advanced Numeration is a full-page 20-exercise taskcard set involving numeration concepts for the older student: place value of larger numbers, expanded form, powers of 10, decimal concepts, scientific notation with positive and negative exponents, and answer key.   All taskcard series are available in all three formats.

Name_____ Date_____

1) 3.4×10^2 = ___340____

2) 1.5×10^2 = _____

3) 9.6×10^3 = _____

4) 2.7×10^2 = _____

5) 4.8×10^0 = _____

6) 9.7×10^2 = _____

7) 8.6×10^1 = _____

8) 7.5×10^0 = _____

9) 2.5×10^3 = _____

10) 4.8×10^2 = _____

11) 1.5×10^3 = _____

12) 2.5×10^2 = _____

13) 7.7×10^0 = _____

14) 3.3×10^3 = _____

15) 5.5×10^1 = _____

16) 3.5×10^2 = _____

17) 9.3×10^0 = _____

18) 1.6×10^3 = _____

19) 2.9×10^1 = _____

20) 4.4×10^2 = _____

More Advanced Numeration 10

Equivalence matching cards matches fraction, decimals, and some commonly used percentages. They are printed with black ink on colored cardstock. The "1ˢᵗ card" can be placed in any order, but the "2ⁿᵈ" and "3ʳᵈ" cards must be placed with the appropriate question cards. Another option is to use the 1ˢᵗ card as a free-response exercise and the remaining cards as a control. Equivalence has 10 exercises, an answer key, and organization labels for containers.

1st	2nd	3rd
$\frac{1}{20}$ Equivalence 4	$\frac{5}{100}$ Equivalence 4	.05 Equivalence 4
$\frac{1}{10}$ Equivalence 4	$\frac{10}{100}$ Equivalence 4	.10 Equivalence 4
$\frac{1}{50}$ Equivalence 4	$\frac{2}{100}$ Equivalence 4	.02 Equivalence 4
$\frac{1}{25}$ Equivalence 4	$\frac{4}{100}$ Equivalence 4	.04 Equivalence 4
$\frac{1}{4}$ Equivalence 4	$\frac{25}{100}$ Equivalence 4	.25 Equivalence 4
$\frac{1}{2}$ Equivalence 4	$\frac{5}{10}$ Equivalence 4	.5 Equivalence 4
$\frac{1}{5}$ Equivalence 4	$\frac{2}{10}$ Equivalence 4	0.2 Equivalence 4
$\frac{4}{5}$ Equivalence 4	$\frac{8}{10}$ Equivalence 4	.8 Equivalence 4

Name_____   Date_____   4

Follow the example given to complete the fraction/decimal equivalency chart.

$\frac{1}{20}$	$\frac{5}{100}$	.05
$\frac{1}{10}$	$\frac{}{100}$	.10
$\frac{1}{50}$	$\frac{}{100}$	
$\frac{1}{25}$	$\frac{}{100}$	
	$\frac{25}{100}$	.25
	$\frac{5}{10}$	
	$\frac{}{10}$	0.2
	$\frac{8}{10}$	

Equivalence reproducible masters and digital downloads come in a free-response worksheet format on which children record their own answers. They have the same problems as their cardstock counterparts.

Percent
(cardstock, reproducible blackline masters, & digital downloads)

Percent is a step-by-step 20-exercise series that introduces concept of percent and encourages intuition in its application. First 10 exercises emphasize fractional equivalents through conversions, percent of a number, estimation, probability, and shipping costs. Second half of the set introduces decimal conversions comparison of values in different formats, simple interest, seeking easier approach to applications, word problems, and cumulative exercises. All taskcards are available in all three formats.

Name_____   Date_____

1) What percentage of the star is shaded? _____

2) What percentage of the star is unshaded? _____

3) What percent of marbles are black? _____

4) What percent of marbles are not black? _____

5) What percent of marbles are spotted? _____

6) Three out of four kids participate in some activity outside of school. What percent is this? _____

7) Emma got 45 out of 50 questions correct. What percent did she get? _____

8) Three out of five kids have keyboarding skills. What percent is this? _____

9) The Tigers won 12 of their 16 games. What percent did they win? _____

10) Lance got 6 hits out of 20 "at bats." What percentage did he hit? _____

11) Rachel sold 17 out of her 20 craft items. What percentage did she sell? _____

12) Henry read 21 of the 50 books on the reading list. What percentage did he read? _____

Lunch order
15 slices of pizza
20 hot dogs
13 hamburgers
12 macaroni & cheese

13) What percent ordered pizza? _____

14) What percent ordered hot dogs? _____

15) What percent ordered mac & cheese? _____

Percent 5

Name_____   Date_____

Many percents can be changed to a commonly used fraction (See Percent 4). In such a case, the easiest way to find percent of a number is to change the percent to a fraction and multiply.

1) 50% of 12 $= \frac{1}{2}$ of 12 = 6

2) 25% of 12 = _____

3) $33\frac{1}{3}$% of 12 = _____

4) 75% of 12 = _____

5) 50% of 30 = _____

6) 10% of 30 = _____

7) 60% of 30 = _____

8) $33\frac{1}{3}$% of 30 = _____

9) 30% of 60 = _____

10) $66\frac{2}{3}$% of 60 = _____

11) 25% of 60 = _____

12) 20% of 60 = _____

13) 75% of 24 = _____

14) $12\frac{1}{2}$% of 24 = _____

15) $37\frac{1}{2}$% of 24 = _____

16) $33\frac{1}{3}$% of 24 = _____

17) 100% of 20 = _____

18) 60% of 20 = _____

19) 75% of 20 = _____

20) 150% of 20 = _____

Percent 6

Name_____   Date_____

Tax is 10%

$29.00 $40.00 $12 $25 $15 $55

Shipping and handling: 20%

For this exercise, compute tax and shipping separately

Calculate tax for:

1) Music CD _____

2) Basketball _____

3) Skateboard _____

4) MP3 player _____

5) Shirt _____

6) Baseball glove _____

Calculated shipping & handling for:

7) Music CD _____

8) Basketball _____

9) Skateboard _____

10) MP3 player _____

11) Shirt _____

12) Baseball glove _____

If tax is 5%, what is the total cost of a $20 shirt? _____ $21

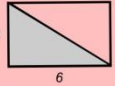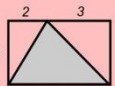($\frac{1}{20}$ of $20 = $1   The shirt costs $20, and the tax is $1, so the total cost is $21.)
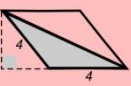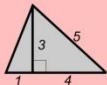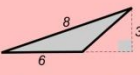
13) If tax is 10%, what is the total cost of a $30 game?_____

14) If shipping is 20%, what is the total for a $25 MP3 player? _____

15) If shipping is 15%, what is the total cost for $100 book order? _____

16) If shipping is $12\frac{1}{2}$%, what is the total for a $24 pair of jeans?_____

17) If tax is 5%, what is the total cost of a $60 desk? _____

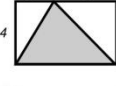18) If shipping is 20%, what is the total for a $40 skateboard? _____
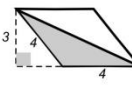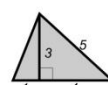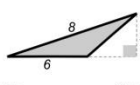
Percent 9

1st	2nd	3rd
Intermediate · Geometry 2	$\frac{1}{2}$ of 16 sq units Intermediate · Geometry 2	8 units^2 Intermediate · Geometry 2
4 6 Intermediate · Geometry 2	$\frac{1}{2}$ of 24 sq units Intermediate · Geometry 2	12 units^2 Intermediate · Geometry 2
2 3 4 Intermediate · Geometry 2	$\frac{1}{2}$ of (5 x 4) Intermediate · Geometry 2	10 units^2 Intermediate · Geometry 2
3 4 4 Intermediate · Geometry 2	$\frac{1}{2}$ of (3 x 4) Intermediate · Geometry 2	6 units^2 Intermediate · Geometry 2
3 5 1 4 Intermediate · Geometry 2	$\frac{1}{2}$ of (5 x 3) Intermediate · Geometry 2	$7\frac{1}{2}$ units^2 Intermediate · Geometry 2
8 3 6 Intermediate · Geometry 2	$\frac{1}{2}$ of (6 x 3) Intermediate · Geometry 2	9 units^2 Intermediate · Geometry 2

Cardstock version

Appropriate for grades 5-8, Geometry Intermediate matching cards cover a wide range of skills: angles in a triangle; perimeter, area, & volume; circle terminology, circumference, and area; parallel lines, transversal, and angle measurements; solid figures, prisms, surface area, and Pythagorean Theorem. The 15-exercise set also includes answer keys and organization labels for containers.

Reproducible Blackline or Digital PDF Download

Geometry Intermediate reproducible blackline masters and digital PDF downloads are free-response workpages that correspond to the cardstock counterparts.

Name_____		Date_____
1st Intermediate · Geometry 2	2nd $\frac{1}{2}$ of 16 sq units Intermediate · Geometry 2	3rd 8 units^2 Intermediate · Geometry 2
1st 4 6 Intermediate · Geometry 2	2nd $\frac{1}{2}$ of _ _ _ _ _ _ Intermediate · Geometry 2	3rd A = _____ Intermediate · Geometry 2
1st 2 3 4 Intermediate · Geometry 2	2nd $\frac{1}{2}$ of _ _ _ _ _ _ Intermediate · Geometry 2	3rd A = _____ Intermediate · Geometry 2
1st 3 4 4 Intermediate · Geometry 2	2nd $\frac{1}{2}$ of _ _ _ _ _ _ Intermediate · Geometry 2	3rd A = _____ Intermediate · Geometry 2
1st 3 5 1 4 Intermediate · Geometry 2	2nd _ _ _ _ _ _ _ _ Intermediate · Geometry 2	3rd A = _____ Intermediate · Geometry 2
1st 8 3 6 Intermediate · Geometry 2	2nd _ _ _ _ _ _ _ _ Intermediate · Geometry 2	3rd A = _____ Intermediate · Geometry 2

Advanced Decimals
(cardstock, reproducible blackline masters, & digital downloads)

Advanced Decimals is a step-by-step 20-exercise series that includes all concepts for understanding decimals for older students. Included are place value of decimals with multiple places, more difficult fraction and decimal equivalents, negative powers of 10, ordering decimal and fraction combinations, rounding, decimal placement in operations, percent, and answer keys.

Name_____ Date_____

Indicate >, <, or =.

1) 0.004 _____ 0.4

2) 1.7 _____ 1.698

3) 0.257 _____ 0.26

4) 0.6 _____ 0.60

5) 2.07 _____ 2.70

6) 9.8 _____ 9.80

7) 2.5 _____ $2\frac{6}{10}$

8) $5\frac{7}{10}$ _____ 5.07

9) 0.680 _____ $.6800$

10) $\frac{1}{10}$ _____ $.01$

11) $\frac{2}{1000}$ _____ $.002$

12) $.00030$ _____ $.003$

13) $8\frac{1}{2}$ _____ 8.2

14) $.5$ _____ $\frac{1}{5}$

15) $\frac{99}{100}$ _____ 9.9

16) $\frac{5}{1000}$ _____ $.0005$

Advanced Decimals 10

Advanced Geometry
(cardstock, reproducible blackline masters, & digital downloads)

Advanced Geometry is a comprehensive free-response 30-exercise packet that includes all concepts for grades 6-8 and readies students for high school geometry. It includes transversals, angles, triangles, quadrilaterals, polygons, perimeter, area, composite area, volume, and composite volume of most plane and solid figures. It goes on to explore Pythagorean Theorem, similar figures, proportion, all four quadrants of the coordinate system, translations, reflections, problem solving, and answer keys. All taskcards are available in all three formats.

Name_____   Date_____

Basic vocabulary

1) Set of all points _____

2) Specific location in space _____

3) Flat surface extending in all directions without end: _____

4) Straight path that extends forever without end _____

5) Shortest distance between two points _____

6) Straight path with only one endpoint _____

7) Lines in the same plane that never meet _____

8) Lines in the same plane that meet _____

9) Lines that meet at right angles _____

10) Lines in two different planes _____
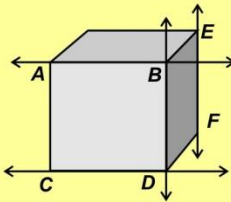
11) What is the intersection of $\overleftrightarrow{AB}$ & $\overleftrightarrow{DB}$? _____

12) Name a line that is parallel to $\overleftrightarrow{CD}$. _____

13) Name a line perpendicular to $\overleftrightarrow{AB}$ _____

14) Name a skew line to $\overleftrightarrow{CD}$ _____

15) Name two rays _____

16) Name two planes _____

17) What is the intersection of $\boxed{ACD}$ & $\boxed{BEF}$? _____
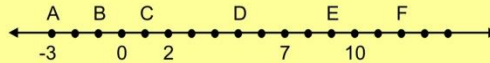
Find the length

18) $\overline{AB}$ = ___2___ $\overline{BD}$ = _____ $\overrightarrow{EF}$ = _____ $\overleftrightarrow{CD}$ = _____

19) $\overline{AB} + \overline{DE}$ = _____ $\overline{CE} - \overline{DE}$ = _____ $\overline{DE} - \overline{CD}$ = _____ $\overline{AF} - \overline{DE}$ = _____

Name the segment

20) $\overline{AB} + \overline{BD}$ = __$\overline{AD}$__ $\overline{AC} - \overline{AB}$ = _____ $\overline{DF} - \overline{EF}$ = _____ $\overline{AE} - \overline{AD}$ = _____

21) $\overrightarrow{AB} + \overline{DE}$ = _____ $\overleftrightarrow{CE} + \overline{DE}$ = _____ $\overline{CF} - (\overline{DE} + \overline{CD})$ = _____

Advanced Geometry 1

Operations with Negatives

Operations with Negatives is a 20-exercise introduction of negative integers and rationals with number line and counters. It addresses addition, subtraction, multiplication, and division with counters and number lines. It goes on to explore division as the inverse of multiplication. The series also includes absolute value, rules for all four opeations, logic, order of operations, mixed practice, word problems, and answer keys. All taskcards are available in all three formats.

Name_____   Date_____

The set of integers includes the counting numbers 1, 2, 3, 4 ...... , 0, and negatives of the counting numbers ...... -4. -3, -2, -1. Just as there is no last whole number, there is no last negative integer. For that reason, a number line of integers has an arrow at both ends.

$$\longleftarrow \; -10 \; -9 \; -8 \; -7 \; -6 \; -5 \; -4 \; -3 \; -2 \; -1 \; 0 \; 1 \; 2 \; 3 \; 4 \; 5 \; 6 \; 7 \; 8 \; 9 \; 10 \; \longrightarrow$$
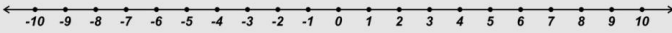
Positive and negative numbers can be written many ways. For example, four more than zero may be written as positive 4, +4, $^+4$, or merely 4. Four less than zero may be written as negative 4, -4 or $^-4$.

Tell whether the following numbers are integers.

1) Positive 2 _____   2) $\frac{1}{8}$ _____   3) Negative 5 _____

4) $^+.19$ _____   5) 6.00 _____   6) $^-25$ _____

7) +10,235 _____   8) $\frac{4}{5}$ _____   9) $-\frac{9}{3}$ _____

Which is more?

10) 5 or +4 _____   11) -5 or -4 _____   12) 1 or $^-2$ _____

13) 0 or -1 _____   14) $^-20$ or $^-30$ _____   15) -10 or 10 _____

>, <, or =

16) -3 ____ 0   17) $^+2$ ____ $^-2$ 18) -3 ____ -2

19) $^-15$ ____ $^-30$ 20) -13 ____ -16   21) $^+2$ ____ 2

Name the integer that is
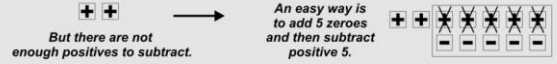
22) 3 more than +2 _____   23) 3 more than -5 _____

24) 3 more than 0 _____   25) 3 more than $^-3$ _____

26) 6 less than $^+2$ _____   27) 6 less than -10 _____

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Negatives 1

Name_____   Date_____

What if you are subtracting, but there are not enough counters to take away. You merely add zeroes until you have enough.

Consider the problem $^+2 - ^+5 =$

But there are not enough positives to subtract.   *An easy way is to add 5 zeroes and then subtract positive 5.*

Subtracting 5 is the same as adding $^-5$.

$^+2 - ^+5 = ^+3$ is the same as $^+2 + ^-5 = ^-3$

Use counters or pictures to give the following results.

$^+2 - ^+3 =$ $^+2 - ^+3 =$ _____
$^+2 + ^+3 = ^-1$

1) $^+1 - ^+4 =$ _____

2) $^-2 - ^-3 =$ _____

Use counters or pictures to give the following differences. Write only the answers.

3) $^+1 - ^+3 =$ _____   4) $^-1 - ^-3 =$ _____

5) $^-2 - ^-6 =$ _____   6) $^+2 - ^+4 =$ _____

7) $^-4 - ^-5 =$ _____   8) $^-2 - ^-5 =$ _____

9) $^+1 - ^+7 =$ _____   10) $^-3 - ^-8 =$ _____

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Negatives 8

Name_____   Date_____

Simplify the following expressions

1) $25 + ^-2 =$ _____   2) $17 - ^-8 =$ _____

3) $(^-3)(5 + ^-4) =$ _____   4) $-\left|\frac{^-15}{3}\right| =$ _____

5) $(5 - 7)(6 + 2)$ _____   6) $^-2\left(^-5\right)^2 =$ _____

7) $|^-8 \cdot ^-2 \cdot ^-1| =$ _____   8) $-|^-7 + ^+4| =$ _____

9) $(-3)^2(-1)^3 =$ _____   10) $-\frac{3}{4}x - \frac{2}{9} \div -\frac{2}{3} =$ _____

11) $(-3)^3 + (-1)^2 =$ _____   12) $(-1 - ^-3)^3 =$ _____

13) $^-15 \cdot |^-2| =$ _____   14) $\frac{(8-12)}{-2} =$ _____

>, <, or =

15) $|^-3|$ ____ $-|^-3|$ 16) $(^-2)^3$ ____ $(^-3)^2$ 17) $-|^-4 + 3|$ ____ -2

18) $-|^-15|$ ____ $^-3 \cdot 5$ 19) $\frac{^-1.8}{-.03}$ ____ $\frac{^-1.8}{.03}$ 20) $-|^-2 \cdot 3|$ ____ $(^-2 \cdot ^-3)$

Sometimes, always, or never?

21) The square of a number is less than its cube. _____

22) The sum of the absolute value of two numbers is positive. _____

23) The product of three negative values is positive. _____

24) The temperature in Skagway is 4 degrees Celsius. Over the weekend it is expected to get 9 degrees colder. What is the predicted temperature? _____

25) A running back gained an average of 4 yards per carry for 5 plays. The quarterback passed for an additional 30 yards. The team was penalized -35 yards. What was the net gain? _____

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Negatives 20

Order of Operations

Order of Operations 2

Name_____   Date_____

Evaluate the following expressions.

1) $6(8 - 2) =$ _____

2) $15 + (3 \cdot 2) - 6 =$ _____

3) $(15 + 3) \times (2 - 6) =$ _____

4) $5 + |8 - 9| =$ _____

5) $3|{}^-8 \cdot 2|$ _____

6) $(4 + 3)(2 - 6)(1 + 9) =$ _____

7) $(35 - 25)\ 4 =$ _____

8) $(10 + 8) \div 3 =$ _____

9) $(50 + 6) \div (8 - 1)$ _____

10) $(9 \cdot 7) - (2 \cdot 3) =$ _____

11) $(48 - 8) \div 5 =$ _____

12) $8(4) \div 2 =$ _____

13) $(5 - 1 + 2 - 6)\ 248$ _____

14) $|7 - 8| \times |8 - 7| =$ _____

15) $15\ |1 - {}^-3| =$ _____

16) $9(6 - 5 + 8 - 9 + 1) =$ _____

17) $(5^2) + (1^2) =$ _____

18) $(10^2)\ (5 + 5) =$ _____

Order of Operations is appropriate after students understand operations with negatives. The 10-exercise series applies absolute value, grouping symbols, mixed operations without grouping symbols, variables representing specific values, numerators and denominators, and word problems. Taskcards are available in all three formats and include answer keys.

Order of Operations 6

Name_____   Date_____

When addition, subtraction, multiplication, and/or division are used together, always do multiplication and division first. Enclosing multiplication or division within your own grouping symbol will help you remember which comes first.

$$5 + 3 \times 4 + 2 =$$
$$5 + (3 \times 4) + 2 =$$
$$5 + 12 + 2 =$$
$$19$$

1) $3 \times 1 + 6 + 8 =$

_____
_____
_____

2) $(5 + 10 \times 2) \div 5 =$

_____
_____
_____

3) $2 \times 3 + 6 - 5 \times 2 =$

_____
_____
_____

4) $5^2 - 3 \cdot {}^-6 + 2$

_____
_____
_____

5) $2 + 5 \cdot 3 + 6 \cdot 4 =$

_____
_____
_____

6) $-3 + 2 \cdot 4 \cdot 3 - 3 =$

_____
_____
_____

7) $9 + 6 \div 3 + 2 \div 2 =$

_____
_____
_____

8) $10 \div 3 + 2 \cdot 5 =$

_____
_____
_____

Order of Operations 10

Name_____   Date_____

Simplify the following expressions

1) $5 + 2 \times 6 - 9 =$ _____

2) $-5^2 + 3 =$ _____

3) $5({}^-3)^0 + 4 =$ _____

4) $-\left|\dfrac{{}^-15}{3}\right| - 5 =$ _____

5) $5 - (6 + 2)$ _____

6) $3 + 4 \cdot 2^3 =$ _____

7) $|{}^-8 \cdot {}^-2 - {}^-1| =$ _____

8) $6 - [\,2 - (-5)\,]\,3 =$ _____

9) $2^3 \cdot 2^1 \cdot 2^2 \cdot 2^0 =$

10) $\dfrac{2}{3} - \dfrac{3}{4} \cdot \dfrac{2}{9} =$

11) $-2^3 - 3 - ({}^-2)^2 =$ _____

12) $2\,[(-3 + 4)(-1 - 2)] - 2 =$ _____

13) $\dfrac{5(2 + 3^0 + 6)}{3^2 - 2 \cdot 3}$ _____

14) $\dfrac{(8 - 12)^2}{2 + 6 \cdot 3} =$ _____

Evaluate the following if $m = 2$, $n = {}^-1$, and $p = 3$.

15) $m + n \cdot p =$ _____

16) $n[\,mp\,(1 - n^0) - 3\,] =$ _____

17) $\dfrac{p^2 - |m + n \cdot 2|}{mnp^2} =$ _____

18) Add 3 and 2. Square the result and then add 5. Multiply that result by 4.

$[(3 + 2)^2 + 5]\ 4 =$ _____   _____

19) Square 4. Subtract 6 from the result. Then multiply by 7.

_____   _____

20) Add the absolute value of ${}^-6$ to the square of the sum of 3 and 4. Divide that answer by the sum of 5 and 6,

_____   _____

Algebra Concepts

Albebra Concepts emphasizes prerequisite skills for solving albegraic equations: classification of numbers as reals, rational or irrational, integers, whole numbers, and/or natural numbers. It also includes variables, constants, verbal and algebraic equivalents, and computing the value of algebraic expressions. It concludes with distributive property, combining like-terms, multiplying and dividing terms with exponents, a cumulative review, and answer keys. The 10-exercise series is available in reusable cardstock, reproducible blackline masters, and digital PDF downloads.

Name_____   Date_____

Parts of an algebraic expression
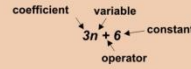
Constant: a number that stands alone (always represents the same value)

Variable: a value that changes in different situations (often represented by a letter)

Coefficient: A number right before a variable. (Multiplier that tells how many times to count the variable; if variable has no coefficient, it is understood to be one)

coefficient   variable
$3n + 6$ —— constant
operator

Terms are groups of variables, coefficient/variable combinations, or constants. Terms are separated by + or -. The expression $2a^2 - 4b + c + 6$ has four terms: $2a^2$, 4b, c, and 6.

Identify the terms in the following expressions.

1) $4x - 3$ ___4x, 3___   2) $2a + 3b$ _____   3) $x^2 + 2xy + y^2$ _____

4) $5p - 3q$ _____   5) $6y^2 - 3y + 8$ _____   6) $\frac{3}{4}z + 2$ _____

7) $\frac{p}{q} + 6$ _____   8) $-m + mn - 1$ _____   9) $12 + b^3 + 7$ _____

It is desirable to combine terms that are alike. Consider the expression $3a + 4b + 3b + a$. We can add the a's together to get 4a, and the b's together to get 7b. The expressions can be rewritten as $4a + 7b$. Combine like terms below.

10) $3x - y + x + 5$ 11) $4a + 3b + 6 + a - b$ 12) $\frac{1}{2}p + 6q + \frac{1}{2}p$

_____   _____   _____

13) $m^3 + 2n + 4 + m^3$ 14) $\frac{1}{2}r + 2d + 3 + 3d$ 15) $.5x + y + 1.2x + .002x$

_____   _____   _____

Variables with exponents must have the same base and same exponent to be combined. For example $2x^2 + 3x^2$ can be combined, but $2x^2$ and $3x$ or $2x^3$ cannot. Combine like terms in expressions below.

16) $4x^2 + 8 - 2x + 2 + x^2$ 17) $5s^2 - s + 3s - s^2$ 18) $y^2 + 3y - y - 3$

_____   _____   _____

19) $3q^2 + q + 2 - 3q^2$ 20) $a^2 + ab + b^2 + a + 3a^2$

_____

Algebra Concepts 5

Name_____   Date_____

Real Numbers (R)

Rational (Q): can be fraction
$\frac{2}{3}$
$-3\frac{2}{7}$ -4
0.25 -9
$0.\overline{6}$ -35

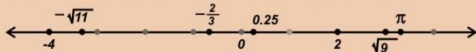**Integer (Z): wholes + negatives of naturals**

Whole numbers (W): naturals + 0
0

Natural numbers (N): Numbers you count with
1   2   12   59   1,246,865
3   633

Irrational (I): cannot be fraction
$\sqrt{5}$ π
$-\sqrt{11}$ $\sqrt{2}$

All numbers most people use are real numbers. They include counting numbers, zero, fractions, and all numbers in between. If a number can be on a number line, then it is real.

$-\sqrt{11}$ $-\frac{2}{3}$ 0.25 π
-4 0 2 $\sqrt{9}$

Remember that integers, wholes, and naturals have no fractional parts. Rationals include anything that can be turned into the ratio of a numerator and a denominator including integers, proper fractions, mixed numbers, terminating decimals, and repeating decimals. Decimals that do not terminate or repeat cannot be turned into an exact fraction and therefore are irrational.

Tell whether the following numbers belong to each classification.
R (Real), Q (Rational), I (Irrational), Z (Integer), W (Whole number), N (Natural number)

7   R ✓   Q ✓   I ✗   Z ✓   W ✓   N ✓

1) -5 R ___   Q ___   I ___   Z ___   W ___   N ___

2) $\sqrt{3}$ R ___   Q ___   I ___   Z ___   W ___   N ___

3) $0.\overline{63}$ R ___   Q ___   I ___   Z ___   W ___   N ___

4) $\sqrt{25}$ R ___   Q ___   I ___   Z ___   W ___   N ___

Always, sometimes, or never

5) Real numbers are rational.   _____

6) Irrational numbers are real.   _____

7) Integers are negative   _____

8) Negative integers are irrational.   _____

Algebra Concepts 1

Name_____   Date_____

R (Real), Q (Rational), I (Irrational), Z (Integer), W (Whole number), N (Natural number)

1) $\sqrt{5}$ R ___   Q ___   I ___   Z ___   W ___   N ___

2) 0 R ___   Q ___   I ___   Z ___   W ___   N ___

3) $0.\overline{3}$ R ___   Q ___   I ___   Z ___   W ___   N ___

Consider the expression $4a^2 + 5b + 8$.

5) How many terms are there? _____   6) List the terms. _____

7) What are the constants? _____   8) List the variables. _____

9) List the exponents. _____   10) What are the coefficients? _____

If $x = 3$, $y = -2$, and $z = 1$, find the value of each of the following expressions.

11) $x^2 + y^2 - yz =$ _____   12) $x^2(y - yz) =$ _____   13) $\frac{x^2 + y^3}{z^3 - 2} =$ _____

Write a verbal expression for the following algebraic expressions.

14) $\frac{cd}{4}$ _____

15) $5(a + b)$ _____

Write an algebraic expression for the following:

16) Eight more than two times the square of some number n   _____

17) Five less than the ratio of p to q   _____

Simplify by distributing or dividing to remove the parentheses; then combine like terms.

1) $2y^2 - 3(y - 2) + y - 4$ 2) $4x(x - 2) - (x - 1)$

_____   _____

3) $\frac{8x^5}{4x^3} + \frac{3x^5y^4}{y^3} - \frac{2x^3}{x}$ 4) $3n^3 + 5n(n^2 + 2n) - 6$

_____   _____

5) $x^0(x^2 + 1) + \frac{3x^2}{x^2} + 2$ 6) $2a^2 + \frac{3a^4}{a^2} - 4a^2$

_____   _____

Algebra Concepts 10

Algebra Equations
15-exercise taskcard set

Algebra Equations 2

Name_____   Date_____

We can use the concept of equality to figure out unknown quantities. Consider the equation to the right. I want to figure out what ☐ represents. In other words, I want to manipulate the equation until it shows that ☐ = a constant.

The left side has ☐ + ⚙. I just want to know the value of ☐, so I merely get rid of everything else. If I subtract a value from the left side I have to subtract the same value from the right side. It's easy to see that ☐ = ⚙ ⚙ ⚙.

Algebraic equations are based on maintaining equality or balance. You can perform any operation if you do the same to both sides (addition, subtraction, multiplication, division properties of equality).

1) ☐ + ✳ = ✳✳☆

Subtraction property   ☐ = _____

2) $n + n$ = ●●●●

Take half of each side. n = _____

3) $x - 1$ = 3

Add 1 to each side. x = _____

4) $\frac{1}{2}n$ = ▲▲▲

Double each side. n = _____

5) $b + |||| $ = ɷɷɷ ||||

Subtraction property b = _____

6) $a - 3$ = 5

Addition property a = _____

7) $y + .2$ = 0.8

Subtraction property y = _____

8) $\frac{1}{3}n$ = 2

Multiplication property n = _____

9) $\frac{1}{4}c$ = 4

Multiplication property c = _____

10) $3x$ = 12

Division property x = _____

Algebra Equations 5

Name_____   Date_____

$x + 1 = 4$
$\underline{-1 = \ -1}$
$x \quad = 4 - 1$
$x \quad = 5$

$x - 3 = 5$
$\underline{+ 3 = \ + 3}$
$x \quad = 5 + 3$
$x \quad = 8$

Simplify constants first.

$x - (-8) = 1$
$x + 8 = 1$
$\underline{\ / 8 = \ -8}$
$x \quad = 1 - 8$
$x \quad = {}^-7$

Isolate the variable by adding or subtracting the same value to both sides. Then solve.

1) $a - 6 = 8$
$\underline{\ / 6 = \ + 6}$
$a = 8 + 6$
$a = 14$

2) $x + 13 = 20$

3) $b - 7 = 20$

4) $y - 20 = 52$

5) $b + 1.4 = 5$

6) $5 + c = 4$

7) $d - 52 = -13$

8) $x + 3 = 1$

9) $14 = a - 2$

10) $0 = d + 5$

11) $y + 2^3 = 10$

12) $x - (-2) = 16$

13) $a + 0.01 = 1$

14) $b - \frac{1}{4} = \frac{1}{3}$

15) $x + \frac{1}{2} = .7$

16) $x - 3^1 = 0.5$

17) $q + 4^0 = 5$

18) $p + \frac{1}{3} = 6$

Algebra Equations 13

Name_____   Date_____

Function charts follow a rule. For example, the following chart shows that the output y is 3 more than the input x. Since the input x can be anything, it is called an independent variable. Since the output y depends on what x is, it is called a dependent variable.

Rule: $y = x + 3$

Input (x)	Output (y)
0	3
1	4
-1	2
2	5
-4	-1

Input and output values can also be used to plot functions on a coordinate graph.

Use the given values on the function chart to determine the rule. Then complete the chart.

1)
Input (x)	Output (y)
0	0
1	2
2	4
-2	
-4	

Rule: _____

2)
Input (x)	Output (y)
0	1
1	2
-1	0
2	
-4	

Rule: _____

3)
Input (x)	Output (y)
2	0
5	3
-1	-3
-2	
0	

Rule: _____

1)
Input (x)	Output (y)
2	4
-1	1
-3	9
0	
3	

Rule: _____

2)
Input (x)	Output (y)
0	1
1	3
-1	-1
2	
-4	

Rule: _____

3)
Input (x)	Output (y)
2	2
1	1.5
-1	.5
-2	
-4	

Rule: _____

Algebra Equations 15

Name_____   Date_____

Name the property being employed in the following algebraic steps.

1) $2(5a + 2b) = $
$10a + 4b$

_____

2) $6x - 3 = 9$
$6x = 9 + 3$

_____

3) $\frac{3p}{4} = 20$
$3p = 80$

_____

Solve and check the following equations.

4) $3c - 4 = 4(2 + 3)$ Check

5) $\left(\frac{2y^2}{y}\right) = y + 1$ Check

Solve and check the following equations on separate paper. Then record the answer here.

6) $y + 3.4 = 2(5)$

7) $p - \frac{1}{2} = \frac{1}{4}$

8) $2(t - 1) = 6$

9) $5x = 12$

10) $3x + x = 24$

11) $2a + 3(a + 1) = 13$

12) $2(2q - 1) = q + 1$

13) $\frac{5x - 2}{3} = 6$

14) $\frac{a - 1}{2} = \frac{a}{3}$

15) Based on the function rule (equation), input values for x, and find the corresponding y value. Then plot the function on the graph.

$y = 2x + 1$

What are the variables? _____
What is the coefficient? _____
What is the constant? _____
What is the independent variable? _____
What is the dependent variable? _____
If x is -2, what is y? _____