

Math Work for ALL Students

4/6 - 4/10

1. Complete worksheets (division and fractions)- no calculators
2. Play Absolute Zero with someone in your house (if you have cards)- directions included
3. Work on ALEKS for at least 1 hour (if you have internet access)
4. Choose ONE of the following problems to work on:

Hailstone Problem

A **conjecture** is like a math hypothesis. It's an idea that we have that is unproven. You are going to create a conjecture about what you see happening in a math problem.

You are going to pick a number to start (between 1 and 100).

If the number is **even**, divide it by 2.

If the number is **odd**, multiply it by 3 AND add 1.

Continue to do these things with each new number you get, and make a number string. You will get a pattern of numbers that gets bigger and smaller. Keep going until you can't go any farther.

Example:
I pick 20 to start.

20, 10, 5, 16, 8, 4, 2, 1

Since 20 is even, I divided it by 2. Then 10 is also even, so I divided by 2. Then 5 is odd, so I multiplied by 3 (15) and added 1. 16 is even so I divide by 2, 8 is even so I divide by 2, four is even so I divide by 2, two is even so I divide by 2, and then I get to 1. If I multiplied by 3 and added 1, I would get to 4. I already used 4. If I repeat a number, I'm done.

Follow the pattern with **10 different starting numbers**. What do you notice about your patterns? What **conjecture** can you make about what's happening?

Four 4s

You are going to try to make expressions to equal all the numbers from 1-20 using only four 4s (and all four 4s each time!) and any math operations.

You can use any operations, add, subtract, multiply, divide. Remember that whatever you create, your expressions should follow the **Order of Operations**:

1. Grouping symbols ()
2. Exponents 4^4
(but you can't use an exponent other than 4- it counts as one of your four 4s))
3. Division and Multiplication (in order from left to right)
4. Addition and Subtraction (in order from left to right)

Example:

If I want to make 16, I could use:

$$4 + 4 \times 4 - 4$$

I would multiply 4×4 first, that's 16, so now my equation looks like

$$4 + 16 - 4$$

I would next add $4 + 16$, that's 20, and then subtract 4, which equals 16.

Try to find expressions that equal all the numbers from 1 to 20!

Absolute Zero Card Game

2-4 players

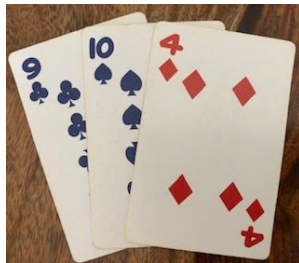
Object of game is to have a sum of zero in your hand.

- Start by dealing every player 3, 4, or 5 cards (as long as every player has the same number of cards).
- **Black** cards (spades & clubs) are **positive** numbers; **red** cards (hearts & diamonds) are **negative**. Aces are 1, face cards (jack, queen, king) are 10, and so forth.
- Look at the cards you have. Add the value of the black positive cards together. Add the value of the red negative cards together. If you subtract them from each other, how far are you from zero? This gives you a strategy to start- do you need to get more positive or more negative?
- Put remainder of deck **face down** in the center of table.
- Flip over the top card and place it **next to the face down pile**.
- The person to the left of the dealer starts.
- On your turn, you can draw from **either the face up pile or face down pile**.
- After drawing one card, you must discard one card from your hand. Place your card on top of the **face up pile**. Keep only 3 cards in your hand (or however many cards you started with). Think about what will help you to keep! Try to make your positive and negative balanced to zero!
- The first player to create a value of zero in his or her hand is the winner.
- If no cards remain in the face down pile, the game can end and the person with the sum closest to zero wins **OR** the face up deck is shuffled and placed face down, flipping the top card and the game continues.

Scoring: The object of Absolute Zero is to create a value of zero in your hand. The round is over when someone lays down a hand equaling zero. For example, if Player A has a 7 of clubs, 3 of spades, and 10 of hearts ($7 + 3 + (-10)$) his value would be zero for that round. Other players then calculate the value of their hand, recording their score as the absolute value (distance from zero) of that number. For example, if player B has a -3 in her hand, then she would record a 3 for her score for that round. At the end of the game, the person with the lowest total score wins.

Examples:

My starting cards:



This isn't very good. I have positive 19 and negative 4. If I subtract that, I'm at 15. That's pretty far from zero. I need to get more negative and get rid of a positive card. My strategy to start will be to try to get a red card, and then discard a black card. But depending on what cards I get, my strategy might change! Always pick up a card and think about it first before you discard something.

A winning hand:



I have positive 10 ($7+3$) and negative 10. That balances to zero! I win!

My opponent has these cards when I win:



They have positive 5 and negative 8. If they subtract those numbers, they have 3. That's not a terrible score. It's pretty close to zero.

FOR YOUR AMAZEMENT

DIRECTIONS:

FIRST, work any problem below and find your answer in the answer column.

SECOND, find the letter of the problem and letter of the answer in the maze on page 2. Shade in the path connecting these two letters.

CONTINUE UNTIL YOU HAVE SHADED IN A COMPLETE PATH FROM START TO FINISH.

$.7 \overline{) 1.68}$ 	$.04 \overline{) .2564}$ 	$.009 \overline{) 6.372}$ 
$2.1 \overline{) 7.35}$ 	$.38 \overline{) .646}$ 	$8.2 \overline{) 524.8}$ 
$.015 \overline{) .3405}$ 	$.08 \overline{) 56.24}$ 	$.51 \overline{) 5.508}$ 
$.044 \overline{) .0308}$ 	$.005 \overline{) .0825}$ 	$.93 \overline{) 5.58}$ 
$8.1 \overline{) 62.37}$ 	$7.3 \overline{) .949}$ 	$.064 \overline{) 5.312}$ 

ANSWERS

	708
	703
	3.5
	.13
	.7
	16.5
	7.7
	64
	83
	22.7
	1.7
	2.4
	6.41
	6
	10.8

ALL THE BETTER TO SEE YOU WITH

THE TITLE OF THIS PUZZLE WAS SELECTED FOR A SPECIAL REASON.

TO FIND OUT THE REASON, FOLLOW THESE DIRECTIONS:

Shade in each area which contains a TRUE equation. You should find 18 areas to shade.

Please use pencil so you can erase if necessary.

... a puzzle worth looking into!



$6\frac{1}{2} = \frac{13}{6}$		$3\frac{3}{4} = \frac{16}{4}$	$8\frac{4}{5} = \frac{44}{5}$	$1\frac{4}{5} = \frac{8}{5}$	$2\frac{3}{4} = \frac{11}{8}$
$3\frac{2}{3} = \frac{11}{9}$	$8\frac{1}{6} = \frac{49}{6}$	$9\frac{1}{7} = \frac{64}{7}$	$\frac{39}{5} = \frac{8}{8}$	$4\frac{2}{7} = \frac{31}{7}$	
		$2\frac{1}{2} = \frac{5}{2}$	$6\frac{1}{8} = \frac{49}{6}$	$2\frac{9}{10} = \frac{27}{10}$	
$1\frac{7}{8} = \frac{13}{8}$	$\frac{53}{5}$	$7\frac{1}{5} = \frac{36}{5}$	$5\frac{3}{5} = \frac{28}{10}$		
	$5\frac{3}{10}$	$4\frac{3}{10} = \frac{43}{10}$	$5\frac{1}{6} = \frac{31}{6}$		
	$3\frac{4}{7} = 2\frac{3}{7}$	$1\frac{5}{6} = \frac{11}{6}$	$3\frac{2}{3} = \frac{11}{3}$		
$7\frac{2}{5} = \frac{44}{5}$		$6\frac{1}{8} = \frac{49}{8}$	$\frac{19}{6}$	$6\frac{2}{9} = \frac{56}{9}$	
			$2\frac{5}{6}$		
$3\frac{1}{12} = \frac{37}{3}$	$8\frac{1}{3} = \frac{17}{3}$	$5\frac{1}{3} = \frac{16}{3}$	$9\frac{1}{4} = \frac{35}{4}$	$9\frac{3}{4} = \frac{39}{4}$	
$9\frac{1}{7} = \frac{64}{16}$	$3\frac{2}{5} = \frac{17}{5}$	$2\frac{5}{8} = \frac{21}{8}$	$7\frac{3}{4} = \frac{31}{4}$	$9\frac{1}{2} = \frac{19}{2}$	
		$4\frac{2}{9} = \frac{38}{9}$		$1\frac{6}{7} = \frac{13}{7}$	$\frac{31}{3}$
					$\frac{9}{3}$

How to Convert a Mixed Number to an Improper Fraction

Although mixed numbers are great for everyday use, it is often easier to work with improper fractions when you want to solve math problems. To convert a mixed number to an improper fraction, follow these steps:

1. Multiply the denominator of the fractional part by the whole number, and add the result to the numerator.

For example, suppose you want to convert the mixed number

$$5\frac{2}{3}$$

to an improper fraction. First, multiply 3 by 5 and add 2:

$$(3 \cdot 5) + 2 = 17$$

2. Use this result as your numerator, and place it over the denominator you already have.

Place this result over the denominator:

$$\frac{17}{3}$$

So the mixed number $5\frac{2}{3}$ equals the improper fraction $\frac{17}{3}$.

How to Convert an Improper Fraction to a Mixed Number

1. Divide the numerator by the denominator
2. Write down the whole number result
3. Use the remainder as the new numerator over the denominator. This is the fraction part of the mixed number.

Example: Convert the improper fraction $16/3$ to a mixed number.

1. Divide 16 by 3: $16 \div 3 = 5$ with remainder of 1
2. The whole number result is 5
3. The remainder is 1. With 1 as the numerator and 3 as the denominator, the fraction part of the mixed number is $1/3$.
4. The mixed number is $5\frac{1}{3}$. So $16/3 = 5\frac{1}{3}$.