

Created by Matthew Childers

### Warmup 8/(# of national championships the Alabama Crimson Tide football team have)

1. The consecutive sums project was **VERY** open ended. Each group came up with different patterns. Write a few sentences describing what you thought about this project. Did you like this type of doing math more than usual? Less? Why?
2. Think back to the presentations. Describe a pattern that a **DIFFERENT** group than yours came up with that you thought was interesting. (If you can't remember one, you probably weren't paying close enough attention. You can look at the posters hanging up in back if you want.)

### TURN IN LISCHWE AGE PROBLEM

- HW collectors:
- 2<sup>nd</sup> – Alex
- 4<sup>th</sup> – Sanaa
- 5<sup>th</sup> – Lily
- 6<sup>th</sup> – Adam C

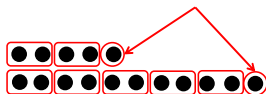
### Project Grades

- This is your first grade that “counts”
- What is an easy way to figure out your percentage?

### Some more consecutive sums patterns...

### Odd number + odd number...

$$5 + 11$$



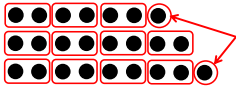
### Even number + odd number...

$$4 + 5$$



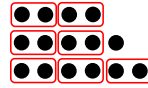
### Odd + Even + Odd...

$$7 + 8 + 9 \dots$$



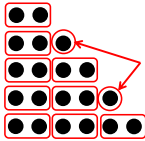
### Even + Odd + Even...

$$4 + 5 + 6 \dots$$



### What about 3 evens + 2 odds?

$$\bullet 2 + 3 + 4 + 5 + 6$$



### Pattern for adding 2 numbers, 3 numbers, 4 numbers...

$1 + 2 = 3$	$1 + 2 + 3 = 6$	$1 + 2 + 3 + 4 = 10$
$2 + 3 = 5$	$2 + 3 + 4 = 9$	$2 + 3 + 4 + 5 = 14$
$3 + 4 = 7$	$3 + 4 + 5 = 12$	$3 + 4 + 5 + 6 = 18$
$4 + 5 = 9$	$4 + 5 + 6 = 15$	$4 + 5 + 6 + 7 = 22$
$5 + 6 = 11$	$5 + 6 + 7 = 18$	$5 + 6 + 7 + 8 = 26$
$6 + 7 = 13$	$6 + 7 + 8 = 21$	$6 + 7 + 8 + 9 = 30$

$1 + 2 + 3 + 4 + 5 = 15$	$1 + 2 + 3 + 4 + 5 + 6 = 21$
$2 + 3 + 4 + 5 + 6 = 20$	$2 + 3 + 4 + 5 + 6 + 7 = 27$
$3 + 4 + 5 + 6 + 7 = 25$	$3 + 4 + 5 + 6 + 7 + 8 = 33$
$4 + 5 + 6 + 7 + 8 = 30$	$4 + 5 + 6 + 7 + 8 + 9 = 39$
$5 + 6 + 7 + 8 + 9 = 35$	$5 + 6 + 7 + 8 + 9 + 10 = 45$
$6 + 7 + 8 + 9 + 10 = 40$	$6 + 7 + 8 + 9 + 10 + 11 = 51$

### 6 numbers...

$$10 + 11 + 12 + 13 + 14 + 15 = 75$$

$$\begin{array}{ccccccc} +1\downarrow & +1\downarrow & +1\downarrow & +1\downarrow & +1\downarrow & +1\downarrow & ? \\ 11 + 12 + 13 + 14 + 15 + 16 = ? \end{array}$$

$$10 + 11 + 12 + 13 + 14 + 15 = 75$$

$$11 + 12 + 13 + 14 + 15 + 16 = ?$$

### A **SHORTCUT** for adding 3 consecutive numbers...

$$\cancel{21} + 22 + \cancel{23}$$

$$\cancel{7} + 8 + \cancel{9}$$

$$199 + 200 + 201$$

Just take the middle number times 3!

A **SHORTCUT** for adding 5 consecutive numbers...

$$1 + 2 + 3 + 4 + 5$$

$$\cancel{8} + \cancel{9} + 10 + \cancel{11} + \cancel{12}$$

$$10 \quad 10 \quad 10 \quad 10$$

Just take the middle number times 5!

Would it work for 6 numbers?

$$3 + 4 + 5 + 6 + 7 + 8$$

$$15 + 16 + 17 + 18 + 19 + 20$$

Last pattern: impossible numbers

1: Impossible	21: $10 + 11, 6 + 7 + 8, 1 + 2 + 3 + 4 + 5 + 6$
2: Impossible	22: $4 + 5 + 6 + 7$
3: $1 + 2$	23: $11 + 12$
4: Impossible	24: $7 + 8 + 9$
5: $2 + 3$	25: $12 + 13, 3 + 4 + 5 + 6 + 7$
6: $1 + 2 + 3$	26: $5 + 6 + 7 + 8$
7: $3 + 4$	27: $13 + 14, 8 + 9 + 10, 2 + 3 + 4 + 5 + 6 + 7$
8: Impossible	28: $1 + 2 + 3 + 4 + 5 + 6 + 7$
9: $4 + 5, 2 + 3 + 4$	29: $14 + 15$
10: $1 + 2 + 3 + 4$	30: $9 + 10 + 11, 6 + 7 + 8 + 9, 4 + 5 + 6 + 7 + 8$
11: $5 + 6$	31: $15 + 16$
12: $3 + 4 + 5$	32: Impossible
13: $6 + 7$	33: $16 + 17, 10 + 11 + 12, 3 + 4 + 5 + 6 + 7 + 8$
14: $2 + 3 + 4 + 5$	34: $7 + 8 + 9 + 10$
15: $7 + 8, 4 + 5 + 6, 1 + 2 + 3 + 4 + 5$	35: $17 + 18, 5 + 6 + 7 + 8 + 9, 2 + 3 + 4 + 5 + 6 + 7 + 8$
16: Impossible	36: $11 + 12 + 13, 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8$
17: $8 + 9$	37: $18 + 19$
18: $5 + 6 + 7, 3 + 4 + 5 + 6$	38: $8 + 9 + 10 + 11$
19: $9 + 10$	39: $19 + 20, 12 + 13 + 14, 4 + 5 + 6 + 7 + 8 + 9$
20: $2 + 3 + 4 + 5 + 6$	40: $6 + 7 + 8 + 9 + 10$

Impossible numbers

- The **ONLY** numbers that are impossible to get from consecutive sums are:
- 1, 2, 4, 8, 16, 32, 64, 128, 256, ...
- Crazy, right?

**COMPETITION**

- There are **FIVE** ways to get 45. The first pair to find them all without a calculator wins!!!
- Seat 1 is with seat 2
- Seat 3 is with seat 4
- DO NOT SAY ANY OUT LOUD! You will give them away!!! Also, please do not look at other papers – that will disqualify you!

**5 ways to get 45**

1.  $22 + 23$
2.  $14 + 15 + 16$
3.  $7 + 8 + 9 + 10 + 11$
4.  $5 + 6 + 7 + 8 + 9 + 10$
5.  $1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9$

## GROUP CHALLENGE:

Stacking Cups Problem

## A simple question:

- How many of these styrofoam cups would I have to stack up to equal my height?
- TALK WITH YOUR GROUP: What information would be helpful for you to know here?

- I am 5 feet, 3 inches tall, which is 160 centimeters.
- **ESTIMATES: How many cups?**
- What **tools** would you need for this?

## YOUR JOB:

- Decide how many cups you think you would need to stack up to equal my height. You will get a few cups and a ruler.
- Early finishers can get the homework early and get started.

## FOUR JOBS PER GROUP

- “Manager”
  - Gets the group’s supplies & puts them back, makes sure everyone else is doing their jobs & stays on task
- “Recorder”
  - Shows all work for the group on the page
- “Calculate-r”
  - Controls the group’s calculator
- “Measurer”
  - Controls the group’s ruler

## How many cups? Estimates (2<sup>nd</sup>)

Group	Estimate
Table A	128
Table B	75
Table C	152
Table D	
Table E	152
Table F	119
Table G	152

### How many cups? Estimates (4<sup>th</sup>)

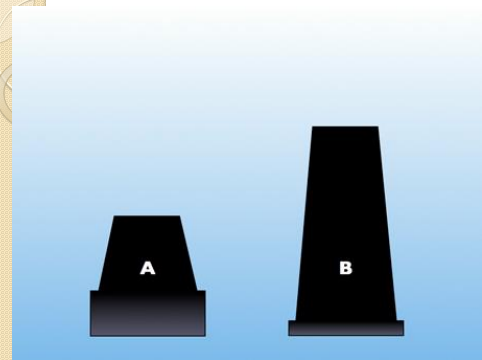
Group	Estimate
Table A	120
Table B	378
Table C	123
Table D	
Table E	152
Table F	152
Table G	152

### How many cups? Estimates (5<sup>th</sup>)

Group	Estimate
Table A	120
Table B	140
Table C	96
Table D	
Table E	120
Table F	174
Table G	208

### How many cups? Estimates (6<sup>th</sup>)

Group	Estimate
Table A	57
Table B	120
Table C	55
Table D	
Table E	125
Table F	240
Table G	109



If I stack 3 of each cup, which stack will be taller? Why?  
If I stack 100 of each cup, which stack will be taller? Why?

### 6<sup>th</sup> Period – DESKS

### HOMEWORK (optional)

- Consecutive Sums Bonus Task



## INTERVENTION:

- **YOU HAVE TWO JOBS!**

1. Write your schedule on your notecard. For each class, put the period number, then the teacher name, then the room number. These will be given to your parents for open house.
2. Go to [www.megisacademicmagnet.org](http://www.megisacademicmagnet.org) and take the enrichment survey. (You will see a button that says "Enrichment Sign Up") If you do not do this by today, you will be placed in a random enrichment!