Warmup $8/(2 + 3 + 4 \; or \; 4 + 5)$

1. **Find your orange sheet and get it out. Rip/cut off the rubric. Put it in the tray.**

2. **Please get with your group. Finalize your poster. Make sure you have your names on it somewhere. Make sure each group member understands and can explain every rule.**

3. *****Check your poster to see how big the examples are. (Could people see them from the back?) If they are too small, <u>you will need to write some examples on a giant whiteboard for your presentation</u>. (Or you can write them really fast on the whiteboard in front during your presentation.)**

Presentations

Expectations for Presenters
- ◦ The entire group needs to go up to the front.
- ◦ Don't just read your poster to us. Teach us your rule in your own words, so that we understand.
- ◦ I would like everybody to speak, so I may ask questions to different group members.
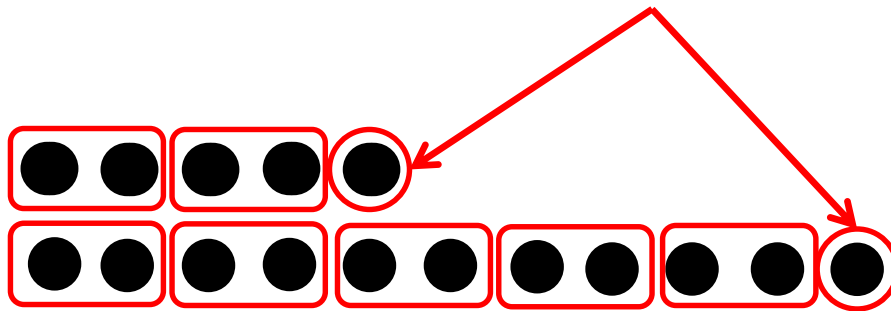
Expectations for the Audience
- ◦ SHOW RESPECT. Absolutely no talking during other presentations.
- ◦ Listen carefully and ask questions if you are unclear about something they are saying.
- ◦ Snaps if a group shares a rule you think is especially good!
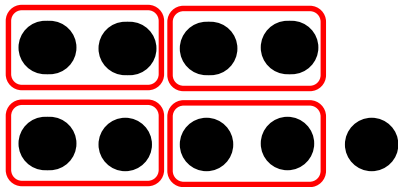
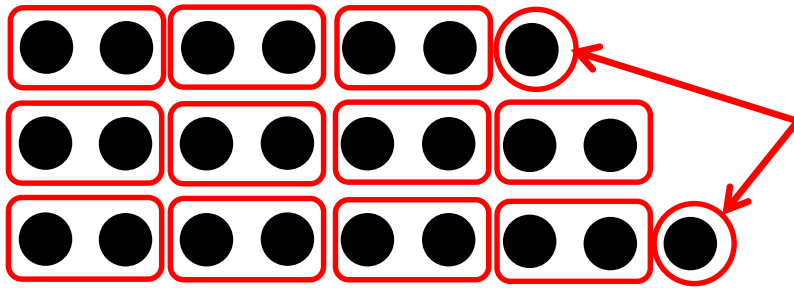# Some more consecutive sums patterns…

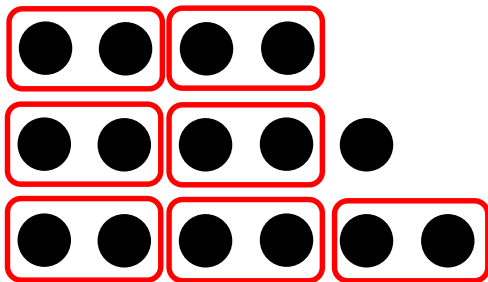# Odd number + odd number…

5 + 11
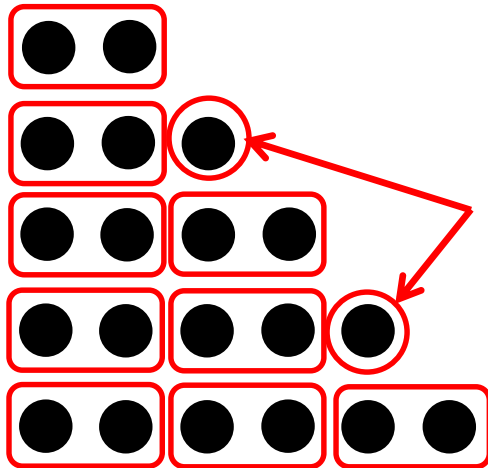
Even number + odd number…

4 + 5

Odd + Even + Odd…

7 + 8 + 9…

Even + Odd + Even…

4 + 5 + 6…

What about 3 evens + 2 odds?

- 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

If you don't repeat any addends…

1 + 2 = 3	1 + 2 + 3 = 6	1 + 2 + 3 + 4 = 10
3 + 4 = 7	4 + 5 + 6 = 15	5 + 6 + 7 + 8 = 26
5 + 6 = 11	7 + 8 + 9 = 24	9 + 10 + 11 + 12 = 42
7 + 8 = 15	10 + 11 + 12 = 33	13 + 14 + 15 + 16 = 58
9 + 10 = 19	13 + 14 + 15 = 42	17 + 18 + 19 + 20 = 74
11 + 12 = 23	16 + 17 + 18 = 51	21 + 22 + 23 + 24 = 90

2 numbers: Sums increase by 4

3 numbers: Sums increase by 9

4 numbers: Sums increase by 16

6 numbers…

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

+1   +1   +1   +1   +1   +1

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

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

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

A **SHORTCUT** for adding 3 consecutive numbers…

21 + 22 + 23

22   22

7 + 8 + 9

8   8

199 + 200 + 201

Just take the middle number times 3!

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

1 + 2 + 3 + 4 + 5

8 + 9 + 10 + 11 + 12

10   10   10   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**
2: **Impossible**
3: 1 + 2
4: **Impossible**
5: 2 + 3
6: 1 + 2 + 3
7: 3 + 4
8: **Impossible**
9: 4 + 5, 2 + 3 + 4
10: 1 + 2 + 3 + 4
11: 5 + 6
12: 3 + 4 + 5
13: 6 + 7
14: 2 + 3 + 4 + 5
15: 7 + 8, 4 + 5 + 6, 1 + 2 + 3 + 4 + 5
16: **Impossible**
17: 8 + 9
18: 5 + 6 + 7, 3 + 4 + 5 + 6
19: 9 + 10
20: 2 + 3 + 4 + 5 + 6

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

Group Work Evaluations

HOMEWORK:

- Consecutive sums bonus task

- Really try to think about it. Don't try to do something really basic that won't be right.

- Remember, the "teach your parents" sheet is due Monday.