

① Something to talk about

8/23/13

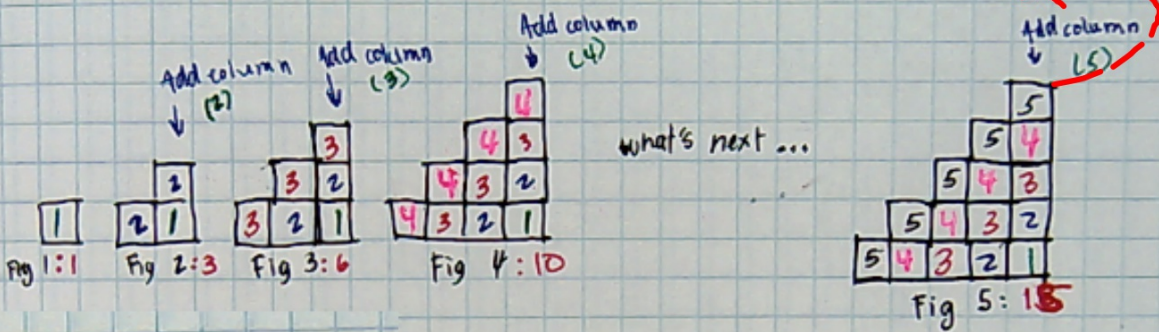


Figure #	Blocks
1	1
2	3
3	6
4	10
5	15

1st difference  
2nd difference

Recursive

$$f(1) = 1$$

$$f(n) = f(n-1) + n$$

Handwritten notes on grid paper illustrating the derivation of the sum of the first  $n$  natural numbers.

**1.** A sequence of five diagrams showing the construction of a square of side length 5. The first diagram is a single square. The second is a 2x2 square. The third is a 3x3 square. The fourth is a 4x4 square. The fifth is a 5x5 square. The side length of the square is labeled as 5.

**2.** A 5x5 square with a diagonal line from the bottom-left to the top-right. The squares along the diagonal are numbered 1 through 5. The total area of the square is labeled as  $X$ . The area of the triangle below the diagonal is labeled as  $\frac{3X}{2} + X$ .

**3.** Could be half a square  
Then add pokey things

$(X \cdot .5X) + X/2$

$(X \cdot .5X) + 1/2X$

1	1	2
2	3	3
3	6	4
4	10	5
5	15	

$f(x) = f(x-1) + x$

$.5x^2 + 1/2x$

F	B
1	1
2	3
3	6
4	10
5	15
6	21
7	28

Figure 1

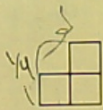


Figure 2



Figure 3

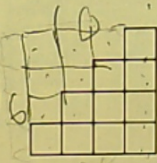
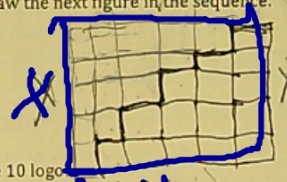


Figure 4

$$\frac{(x+1)^2}{2}$$

Assuming the pattern continues, draw the next figure in the sequence.

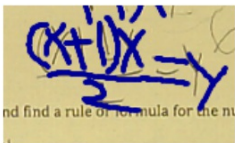


2. How many blocks will be in the size 10 logo

1	-1
2	-1.5
3	-2
4	-2.5
5	-3
6	-3.5

3. Examine the sequence of figures and find a rule or formula for the number of tiles in any figure number.

$$\frac{(x+1)x}{2} = 4$$



$$\frac{(x+1)x}{2}$$

$$\frac{x^2 + 1x}{2}$$

$$.5x^2 + \frac{1}{2}x$$

$$.5x^2 + \frac{1}{2}x$$

Quadratic

$$\frac{(x+1)^2}{2} - \left(\frac{x}{2} + .5\right)$$

$$\frac{x^2 + 2x + 1}{2} - \frac{x + 1}{2}$$

$$.5x^2 + 1x - .5x - .5$$
$$.5x^2 + .5x$$