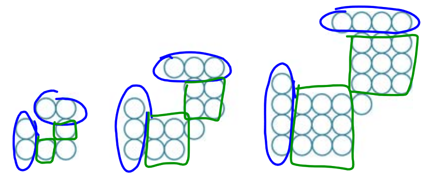
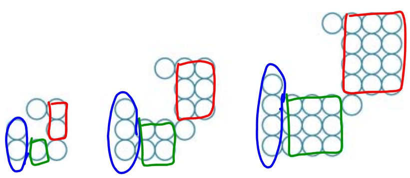
Final exam problem topics (most likely):
- Visual patterns:
  - Linear
  - Non linear with rectangles
  - Non linear with Gauss (triangular numbers)
- Proportions:
  - Writing proportions to represent or solve a problem
  - Writing equations for problems that may not be proportional
    - Non proportional but linear
    - Inversely proportional
- Linear rate equations
- Fraction vs ratio?
- Integers (chips and number lines): especially subtraction and multiplication
- Algebra tiles:
  - solving linear equations
  - factoring trinomials
- Fractions: number line and rectangle representations
  - equivalence
  - addition
  - multiplication

May 5-10:36 AM



I see a column of n + 1, and another one up here. Then I see 2 squares, each side is always n. Plus this extra one tucked in here. So my equation is C = 2(n +1) + 2n^2 + 1.

May 4-9:26 PM



So I see on the left here n + 1. Then I see a square of n by n. Then I see a rectangle of n by (n + 1). And these 2 leftovers. My equation is C = n + 1 + n^2 + n(n + 1) + 2.

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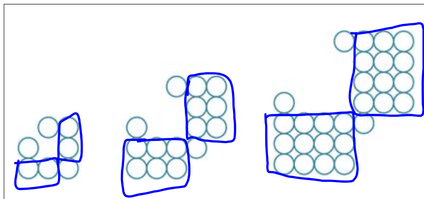

I see two rectangles of the same size. Each one is n by (n + 1). And then the 3 circles here. My equation is C = 2[n(n + 1)] + 3.

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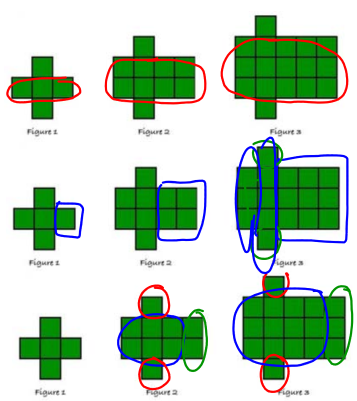

$n(n+2)+2$

n^2+2n+2

$n+n+2+n^2$

$n+n(n+1)+2$

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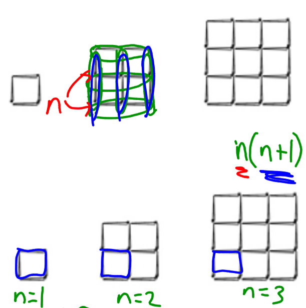


$n(n+1)+n(n+1)$

$=n^2+n+n^2+n$

$n=1$ $n=2$ $n=3$

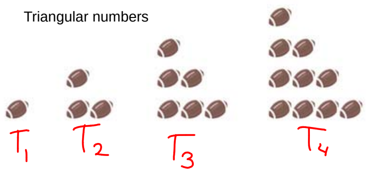
$+8$ $+12$

$4(n-1)+4$

$=4n-4+4=4n$

May 4-9:31 PM

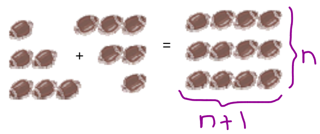
Triangular numbers



A triangular number adds up 1+2+3+...+n.
The formula for a triangular number is n(n+1)/2
One way to get the formula is Gauss' trick of adding it up twice:

$$\begin{array}{l} 1 + \;\; 2 \;\; + \; 3 + \ldots + (n-1) + \;\; n \\ \underline{n + \;\; (n-1) + \;\; \ldots \;\; + \; 2 \;\; + \;\; 1} \\ (n+1)+(n+1)+ \ldots \;\; +(n+1) + (n+1) = n(n+1) \end{array}$$

Another way is to visually add twice



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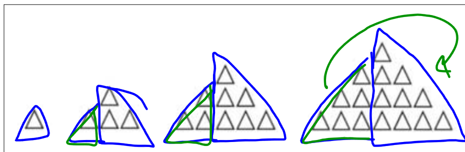

? T_{n-1} $\quad T_3$

$\frac{2\cdot 3}{2} \quad \frac{3\cdot 4}{2}$

$\frac{(n-1)n}{2} + \frac{n(n+1)}{2}$

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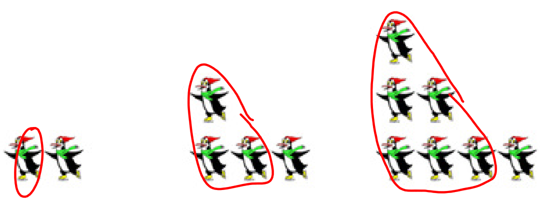

$\frac{n(n+1)}{2} + 1$

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