



- e. What about hexagonal numbers? Can you find a formula for the hexagonal numbers in terms of n ? (Both explicit and recursive.)
- f. Are there any numbers that are both triangular and pentagonal?
- g. Are there any numbers that are triangular, square, and pentagonal?
- h. What kind of algebra solving would this require?



2) Polygonal Numbers via Python

- a. Intro to Python
- b. Make your own account on replit.com
- c. How could we use Python to answer some of our questions above?
- d. What skills would we need?

3) Goal 1: Write a program that prints the first 100 triangular/square/etc numbers.

- a. Making **variables**
- b. Writing a **for loop**
- c. **Print** command
- d. Do this two different ways, using the explicit formula and using a recursive formula via an **increment variable**.



- 4) Goal 2: Write a program that loops through 100000 triangular numbers, but only prints them if they are also a square number.
- If statements.***
 - How do you check is a number is a square number?

- 5) Goal 3: Redo Goal 2 but for other pairs of number types.

- 6) Goal 4: Use list building and comparison to resolve these problems more efficiently.
- Lists/arrays***
 - Function*** definition/creation
 - Nested for loops***



- 7) Can every number be written as the sum of up to three triangular numbers?
a. **Breaking** a **while** loop
- 8) Can every number be written as the sum of up to four square numbers?
- 9) Can every number be written as the sum of up to five pentagonal numbers?
- 10) Wrapping up:
a. What did you notice? What did you wonder?
- b. How could you use some version of this in your class?
- c. What standards might this activity hit, either content or process standards?
- d. What questions do you have?

11) Other Resources:

- a. <https://replit.com/> for python coding and sharing
- b. https://en.wikipedia.org/wiki/Triangular_number
- c. https://en.wikipedia.org/wiki/Square_number
- d. https://en.wikipedia.org/wiki/Pentagonal_number
- e. https://en.wikipedia.org/wiki/Hexagonal_number