

Grab a calculator, we will be taking a pre-assessment soon. It will be counted on your grade as participation.

Also, your homework sheet is due today, I will check off your 2.9H homework and any other assignments.

3.1 Scott's Macho March Madness

A Develop Understanding Task

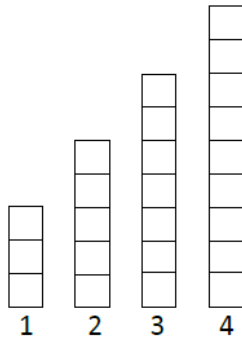


<http://www.flickr.com/photos/whyid/228216226/>

Each year, Scott participates in the "Macho March" promotion. The goal of "Macho March" is to raise money for charity by finding sponsors to donate based on the number of push-ups completed within the month. Last year, Scott was proud of the money he raised, but was also determined to increase the number of push-ups he would complete this year.

Part I: Revisiting the Past

Below is the bar graph and table Scott used last year to keep track of the number of push-ups he completed each day, with day one showing he completed three push-ups and day two showing he completed five push-ups (for a total of eight completed push-ups at the end of day two). Scott continued the pattern seen in the bar graph throughout the month:



n Days	$f(n)$ Push-ups each day	$g(n)$ Total number of pushups in the month
0		
1	3	3
2	5	8
3	7	15
4	9	24
5	11	35
...
n	$2x+1$	x^2+2x

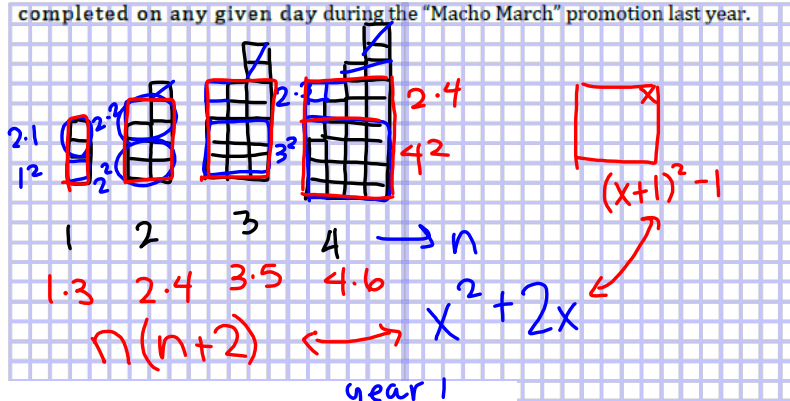
Handwritten notes: $y = mx + b$ (Linear), Quadratic, $3 = m \cdot 1 + b$, $5 = m \cdot 2 + b$, Linear, Constant

- Write the recursive and explicit equations for the number of push-ups Scott completed on any given day last year. Explain how your equations connect to the bar graph and the table above.

$f(n) = 2n + 1$ ← explicit
 recursive: previous + 2
 $f(n) = f(n-1) + 2$
 $f(0) = 1$
 $f(3) = f(3-1) + 2$
 $f(3) = f(2) + 2$
 $f(3) = 5 + 2$

$g(n) = n^2 + 2n$ ← explicit
 recursive: previous + $2n + 1$
 $g(n) = g(n-1) + 2n + 1$
 $g(1) = 3$

- Write the recursive and explicit equation for the total number of push-ups Scott completed on any given day during the "Macho March" promotion last year.



n Days	$f(n)$ Push-ups each day	$g(n)$ Total number of pushups in the month	$z(n)$ total push ups in month for year 2
1	3	3	3
2	5	8	11
3	7	15	24
4	9	24	50
5	11	35	85
...
n			

Part II: Macho March Madness

This year, Scott's plan is to look at the total number of push-ups he *completed for the month* on any given day last year, and do that many push-ups on the same day this year. For example, on day one, he will do three push-ups. On day two, he will do eight push-ups (the sum or total number of push-ups he completed on day one and two from last year). On day three, he will complete 15 push-ups. If Scott follows this pattern, determine the following:

3. How many push-ups will Scott complete on day four? How did you come up with this number? Write the recursive equation to represent the number of push-ups Scott will complete today based on the number of push-ups he completed yesterday.

24; from table

4. How many total push-ups will Scott complete for the month on day four?

$$3 + 8 + 15 + 24 = 50 \text{ push ups}$$

5. Without finding the explicit equation, make a conjecture as to the type of function that would represent the explicit equation for the total number of push-ups Scott would complete on any given day this year.
6. How does the rate of change for this explicit equation compare to the rates of change for the explicit equations in questions 1 and 2?
7. Test your conjecture and justify that it will always be true (see if you can move to a generalization for all polynomial functions).
8. Describe the features of the explicit function for the total number of push-ups Scott would complete on any given day this year.

Homework

3.1 "Ready, Set, Go"