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Lesson 3: Scott's Muscle March

Solidify Understanding

Learning Focus

Model a quadratic function with tables, graphs, and equations.

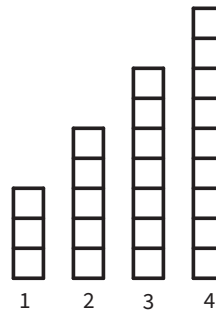
Understand the first difference of a quadratic function.

How can a quadratic function be built from a linear function?

Open Up the Math

Launch, Explore, Discuss

Scott was determined to eat right and get in shape. He joined a gym and added push-ups to his daily exercise routine. He started keeping track of the number of push-ups he completed each day in the bar graph, with day one showing he completed three push-ups. After four days, Scott was certain he could continue this pattern of increasing the number of push-ups for at least a few months.



1. Model the number of push-ups Scott will complete on any given day. Include both explicit and recursive equations.



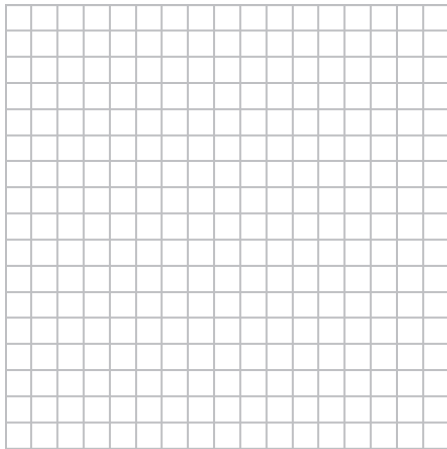
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Scott's gym is sponsoring a "Muscle March" promotion. The goal of "Muscle March" is to raise money for charity by doing push-ups. Scott has decided to participate and has sponsors that will donate money to the charity if he can do a total of at least 500 push-ups, and they will donate an additional \$10 for every 100 push-ups he can do beyond that. So now Scott is going to track the total number of push-ups done up to any given day of the month.

2. Estimate the total number of push-ups that Scott will do in a month if he continues to increase the number of push-ups he does each day in the pattern shown.
3. Draw the diagram that shows the total number of push-ups that Scott has done in the month at the end of each day.



4. How many push-ups will Scott have done after a week?
5. Model the total number of push-ups that Scott has completed on any given day during "Muscle March." Include both recursive and explicit equations.



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Ready for More?

Will Scott meet his goal and earn the donation for the charity? Will he get a bonus? If so, how much? Explain.

Takeaways

Characteristics of Quadratic Functions:

Lesson Summary

In this lesson we modeled a situation with a diagram, table, graph, and equations. We learned that quadratic functions can be models for the sum of an arithmetic sequence and furthered our understanding of the type of change exhibited by quadratic functions.



Retrieval

Multiply using the distributive property. Then add like terms.

1. $x(x + 9) + 2(x - 2)$

2. $3x(2x + 3) - 3(5x - 4)$



Write the first five terms of the sequences defined by the recursive rule.



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3. $f(0) = -23$; $f(n) = f(n - 1) + 4$

4. $g(1) = 1$; $g(n) = 3g(n - 1)$