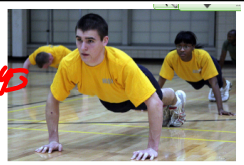
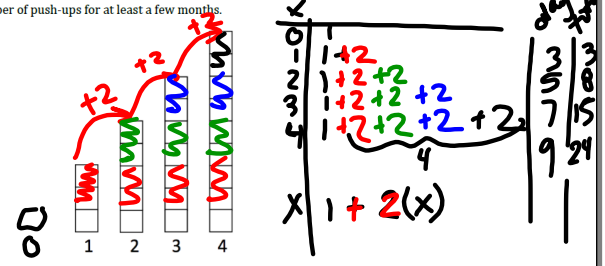
1.3 Scott's Macho March

A Solidify Understanding Task



After looking in the mirror and feeling flabby, Scott decided that he really needed to 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 below, 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.

$y = 1 + 2x$ $y = 3 + 2(x-1)$ $3 + 2x - 2$ $y = 2x + 1$ ✓

$f(x) = f(x-1) + 2$

$f(1) = 3$

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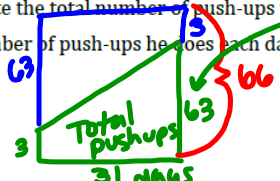
Scott's gym is sponsoring a "Macho March" promotion. The goal of "Macho March" is to raise money for charity by doing push-ups. Scott has decided to participate and has sponsors that will donate money to the charity if he can do a total of at least 500 push-ups, and they will donate an additional $10 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.

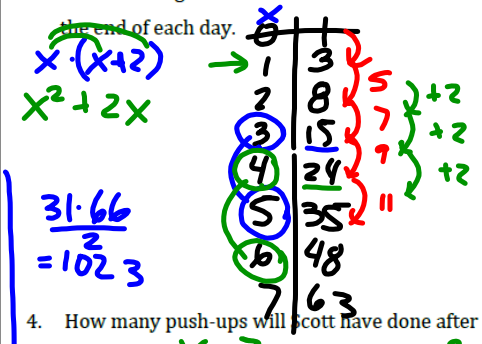
day 31 $= 1 + 2(31) = 63$

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 above.



$\frac{l \cdot w}{2} = \frac{31 \cdot 66}{2} = 1023$

3. Draw the diagram that shows the total number of pushups that Scot has done in the month at the end of each day.



$x \cdot (x+2)$

$x^2 + 2x$

$\frac{31 \cdot 66}{2} = 1023$

$\frac{l(w)}{2}$

$= \frac{x(2x+1+3)}{2}$

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

$= \frac{2x^2 + 4x}{2} = \frac{2x^2}{2} + \frac{4x}{2}$

$= x^2 + 2x$

4. How many push-ups will Scott have done after a week?

$x = 7 \rightarrow 7^2 + 2(7)$

$49 + 14 = 63$

$1023 = 31^2 + 2(31)$

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5. Model the total number of push-ups that Scott has completed on any given day during "Macho March". Include both recursive and explicit equations.

ex: $y = x^2+2x$ or $x(x+2)$

recursive: $f(x)=f(x-1)+(2x+1)$

$f(1)=3$

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

$f(31)=(31)^2+2(31)=1023$

-500

523

$/100 = 5$ bonuses

$\$10$

$\$50$

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Name: Quadratic Functions | 1.3

Ready, Set, Go!

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Ready

Topic: Fundamental Theorem of Arithmetic

The prime factorization of a number is given. Multiply each number to find the whole number that each factorization represents.

1. $2^4 \times 3^1 \times 5^2$ 2. $3^4 \times 5^2 \times 7^2$ 3. $5^2 \times 11^2 \times 13^1$

$16 \times 3 \times 25 =$

The following problems are factorizations of numerical expressions called quadratics. Given the factors, multiply to find the quadratic expression. Add the like terms. Write the x^2 term first, the x-term second, and the constant term last. (*Example:* $ax^2 + bx + c$.)

4. $(x+5)(x-7)$ 5. $(x+8)(x+3)$ 6. $2(x-9)(x-4)$

7. $3(x+1)(x-4)$ 8. $2(3x-5)(x-1)$ 9. $2(5x-7)(3x+1)$

$3(x^2-4x+1x-4)$

$3(x^2-3x-4)$

$3x^2-9x-12$

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SET

Topic: Distinguishing between linear and quadratic patterns

Use first and second differences to identify the pattern in the tables as *linear, quadratic,* or *neither*. Write the recursive equation for the patterns that are linear or quadratic.

10.

x	y
-3	-23
-2	-17
-1	-11
0	-5
1	1
2	7
3	13

a. Pattern:
b. Recursive equation:

11.

x	y
-3	4
-2	0
-1	-2
0	-2
1	0
2	4
3	10

-4 -2 0 2 4 6
2 2 2 2 2

a. Pattern: Quad. x^2
b. Recursive equation: $f(x)=f(x-1)+(2x+0)$

12.

x	y
-3	-15
-2	-10
-1	-5
0	0
1	5
2	10
3	15

a. Pattern:
b. Recursive equation:

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13.

x	y
-3	24
-2	22
-1	20
0	18
1	16
2	14
3	12

a. Pattern:
b. Recursive equation:

14.

x	y
-3	48
-2	22
-1	6
0	0
1	4
2	18
3	42

-26 -16 -6 4 14 24
10 10 10 10 10

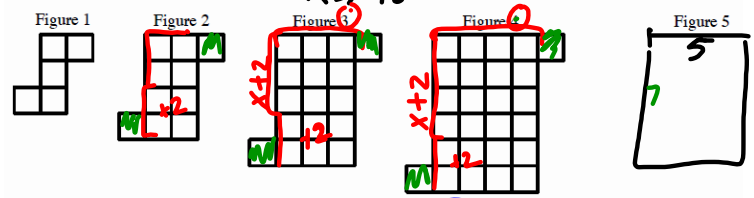
a. Pattern: Quad x^2
b. Recursive equation: $f(x)=f(x-1)+(10x-6)$
$f(3)=48$

15.

x	y
-3	4
-2	1
-1	0
0	1
1	4
2	9
3	16

a. Pattern:
b. Recursive equation:

16.



a. Draw figure 5.
b. Predict the number of squares in figure 30. Show what you did to get your prediction.

$= x(x+2)+2 = x^2+2x+2$
$= 30^2+2(30)+2$
$= 962$

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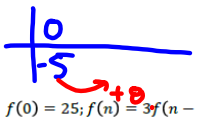
GO

Topic: Interpreting recursive equations to write a sequence

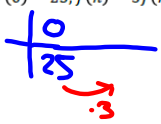
Write the first five terms of the sequence.

17. $f(0) = -5; f(n) = f(n-1) + 8$



18. $f(0) = 24; f(n) = f(n-1) - 5$

19. $f(0) = 25; f(n) = 3f(n-1)$



20. $f(0) = 6; f(n) = 2f(n-1)$

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