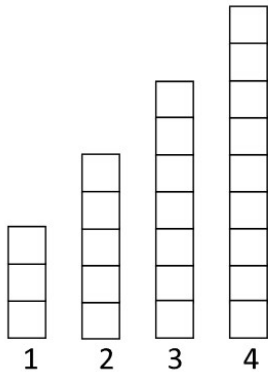


Lesson 1.4 Notes

Scott has decided to add push-ups to his daily exercise routine. He is keeping track of the number of push-ups he completes each day in the bar graph below, with day one showing he completed three push-ups. After four days, Scott is certain he can continue this pattern of increasing the number of push-ups he completes each day.



| Describe the pattern. | How many push-ups will Scott do on day 10? | Recursive rule: | Explicit rule: |
|-----------------------------------|--|---|---|
| Scott adds two push-ups every day | Scott will do 21 push-ups on day ten | $f(0) = 1$ This is how many theoretical push-ups on day zero if the pattern holds true $f(x) = f(x - 1) + 2$ | $f(x) = 2x + 1$ The repeated addition by two is written as a multiplication by x because we don't know how many times we will add two. Then we add the 1 push-up he theoretically would have done on day zero. |

Aly is also including push-ups in her workout and says she does more push-ups than Scott because she does fifteen push-ups every day. Is she correct?

Aly is correct at the beginning. On day seven, Scott will do 15 push-ups. Every day after that Scott will do more push-ups than Aly because he is always increasing the number of push-ups he does.

Other important notes from today:

Evaluate the given equation for the indicated function values.

1. $f(n) = -n + 2$

$f(-4) =$ $f(-4) = -(-4) + 2 \Rightarrow f(-4) = 4 + 2 \Rightarrow f(-4) = 6$

$f(6) =$ $f(6) = -(6) + 2 \Rightarrow f(6) = -6 + 2 \Rightarrow f(6) = -4$

2. $f(n) = (-3)^n$

$f(0) =$ $f(0) = (-3)^0 \Rightarrow f(0) = 1$ **Remember that anything raised to the zero power is equal to 1.

$f(3) =$ $f(3) = (-3)^3 \Rightarrow f(3) = -27$ **Remember that this is $-3 \times -3 \times -3$.

Write a recursive and explicit equation for each sequence. Find the constant difference.

The constant difference is just what we are adding to get to the next term.

The first number in the sequence is $f(1)$, so you will need to go backwards to find what the term before the first term would be to know $f(0)$.

1) $-3, -6, -9, -12, \dots$

The constant difference is -3 .

Recursive Rule:

Explicit Rule:

$$f(0) = 0$$

$$f(x) = -3x \quad \text{*We do not need to write the } +0.$$

$$f(x) = f(x - 1) - 3$$

2) $2, 8, 14, 20, \dots$

The constant difference is $+6$.

Recursive Rule:

Explicit Rule:

$$f(0) = -4$$

$$f(x) = 6x - 4 \quad \text{*The negative belongs to the four.}$$

$$f(x) = f(x - 1) + 6$$

3) $8, 9, 10, 11, \dots$

The constant difference is 1 .

Recursive Rule:

Explicit Rule:

$$f(0) = 7$$

$$f(x) = x + 7 \quad \text{*}x = 1x.$$

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

4) $-18, -16, -14, -12, \dots$

The constant difference is $+2$.

Recursive Rule:

Explicit Rule:

$$f(0) = -20$$

$$f(x) = 2x - 20$$

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

In a traditional coordinate grid, we have x- and y-axes. That doesn't change with function notation.

$f(x)$ takes the place of y in our function to describe our graph.

If this function models the height of a toy rocket that is launched from a hole in the ground, $h(t)$ (which is on the y-as axis) would represent the height of the rocket. The x-axis (or t-axis in this case) would represent time.

