

Warm Up:

Find the next three terms in each pattern.

1. $-5, -2, -3, 0, -1, 2, 1, 4, \dots$
2. $0, 1, 3, 6, 10, 15, \dots$
3. $a + 1, a + 4, a + 9, \dots$
4. $3d - 1, 4d - 2, 5d - 3, \dots$
5. Now that he no longer needs crutches, Kyren's doctor wants to start him on an exercise program. She suggests jogging for 12 minutes per day for the first week and increasing that time by 6 minutes per day each week after that. Write the first three terms of this pattern. How many weeks will it be before Kyren is jogging 60 minutes a day?

Speak Like A Mathematician

- **sequence**: a list of _____ in a specific _____.
- **term of a sequence**: a _____ in a sequence.
- **arithmetic sequence**: a pattern in which each _____ after the first is found by adding a _____ to a previous term.
- **common difference**: the difference between _____ terms in an arithmetic sequence.

Example 1: Identify Arithmetic Sequences

Determine whether each sequence is an arithmetic sequence. Justify your reasoning by identifying the common difference.

- a) $17, 14, 10, 7, 3, \dots$
- b) $-\frac{3}{2}, -\frac{3}{4}, 0, \frac{3}{4}, \frac{3}{2}, \dots$
- c) $-1, -2, -4, -8, \dots$
- d) $0, 1, 4, 9, 16, \dots$
- e) $-5.25, 1, 7.25, 13.5, \dots$

Example 2: Find the Next Three Terms

Determine the next three terms in the sequence.

- a) 11, 7, 3, -1, ...
- b) 18, 11, 4, -3, ...
- c) -1, -2, -4, -8, ...

Key Concept: Arithmetic Sequences as Linear Functions

Each term of an arithmetic sequence can be expressed in terms of the first term _____, and the common difference _____.

Terms	Symbol	In Terms of a_1 and d	22, 17, 12, 7, 2, ...
First Term			
Second Term			
Third Term			
Fourth Term			
Fifth Term			
...	...	...	...
n th Term			

Example 3: Find the n th Term

Write an equation for the n th term of each arithmetic sequence, then use the equation to find the 20th term.

- a) -4, -1, 2, 5, ...
- b) 13, 8, 3, -2, ...
- c) -50, -40, -30, -20, -10, ...

To find the n th term of an arithmetic sequence with the first term a_1 , and the common difference d , you can use this function:



Example 4: Apply Arithmetic Sequences as Linear Functions

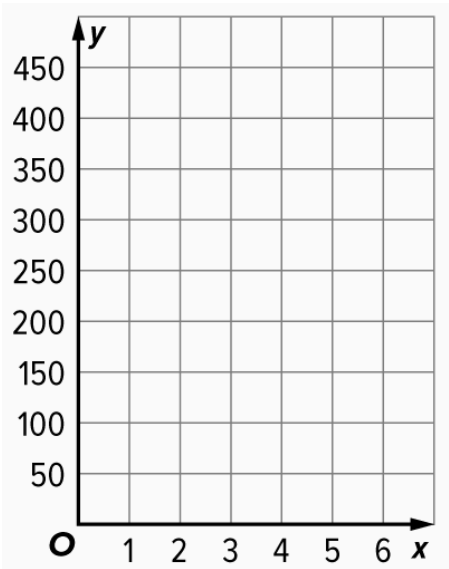
Erick is having his car repaired after an accident. The body shop has a sign displaying the cost of labor.

a) Write a function to represent the sequence.

b) Complete the table to plot the first six hours of labor costs.

n	1	2	3	4	5	6
$f(n)$						

c) Graph the sequence.



Labor Rates

1st Hour	\$140
2nd Hour	\$205
3rd Hour	\$270
4th Hour	\$335
5th Hour	\$400
6th Hour	\$465