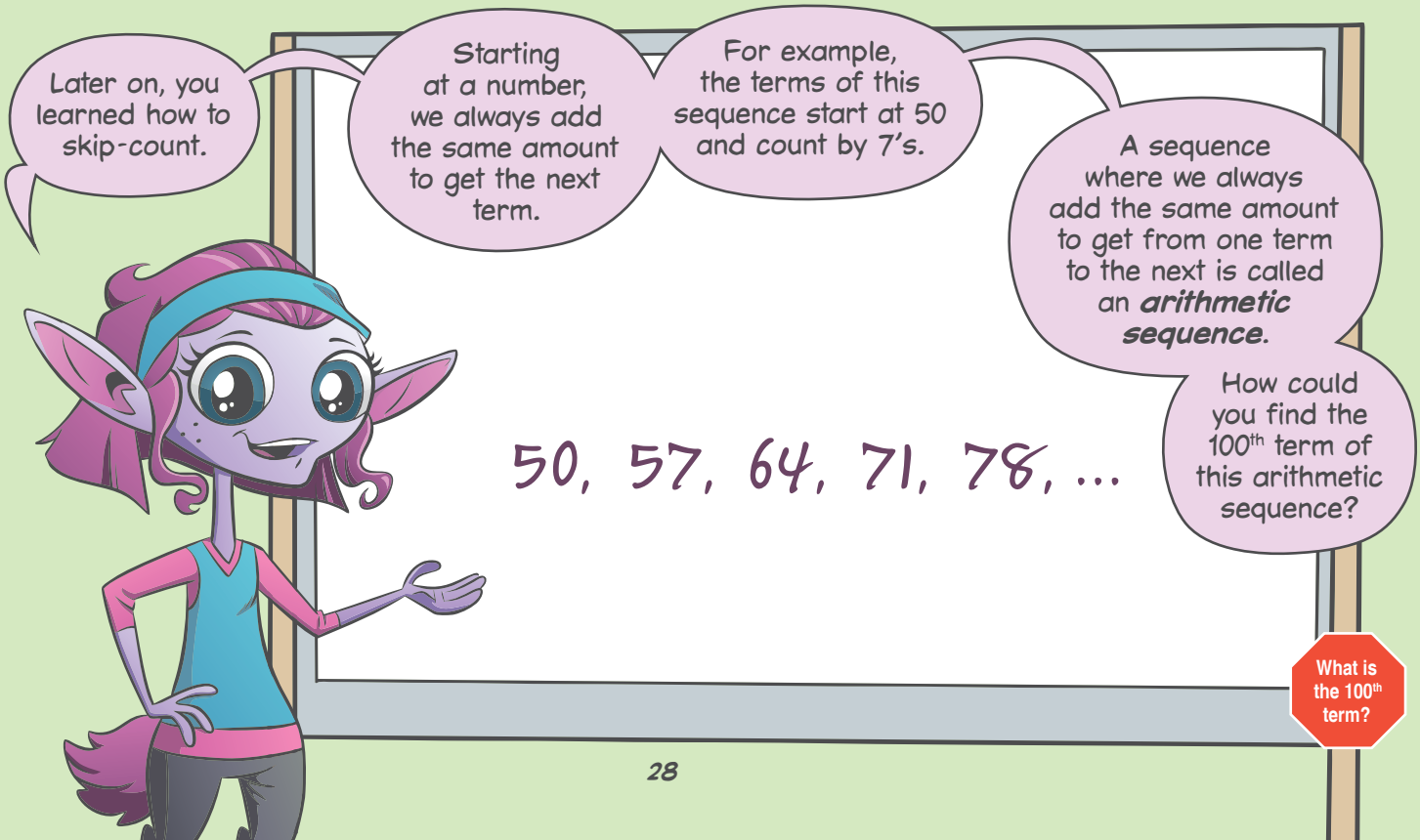
MATH TEAM
Arithmetic Sequences



Term: 1st 2nd 3rd 4th 5th

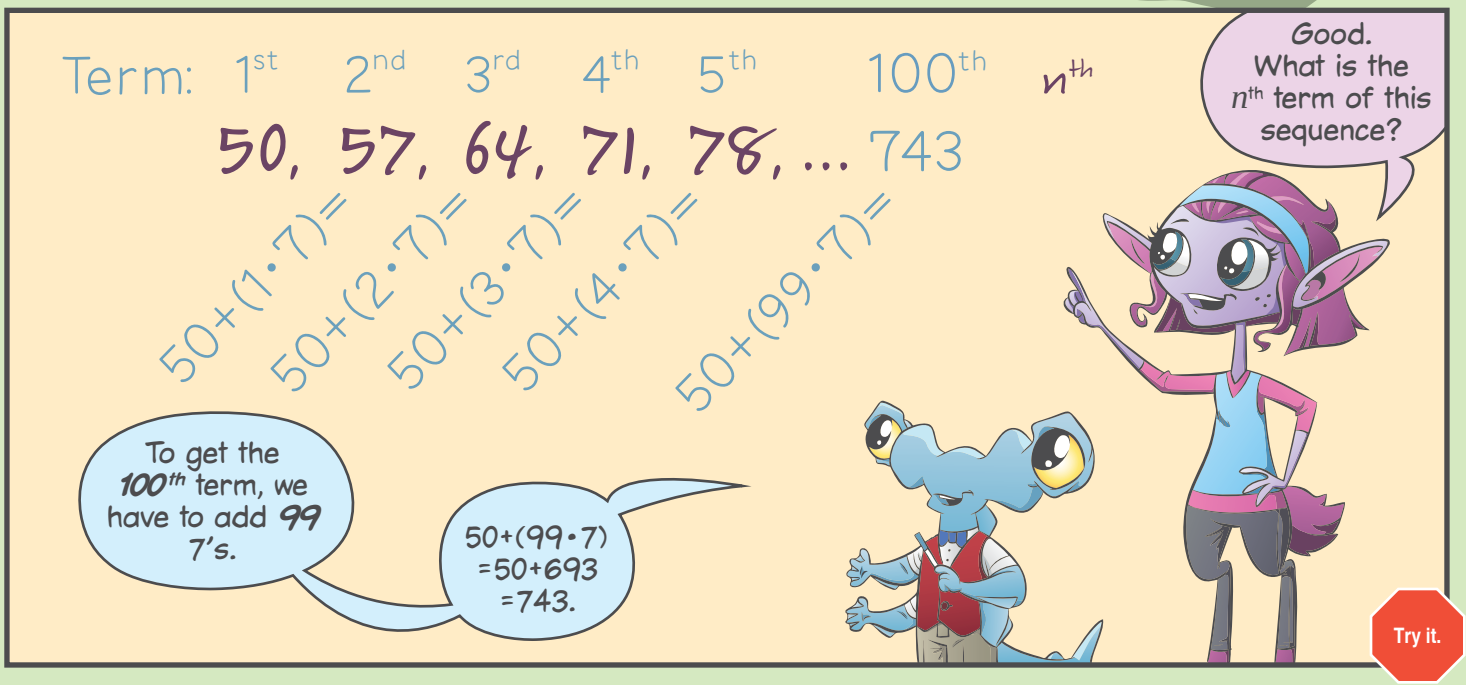
50, 57, 64, 71, 78, ...

$50+(1\cdot 7)=$
$50+(2\cdot 7)=$
$50+(3\cdot 7)=$
$50+(4\cdot 7)=$

Term: 1st 2nd 3rd 4th 5th 100th n^{th}

50, 57, 64, 71, 78, ... 743

$50+(1\cdot 7)=$
$50+(2\cdot 7)=$
$50+(3\cdot 7)=$
$50+(4\cdot 7)=$
$50+(99\cdot 7)=$

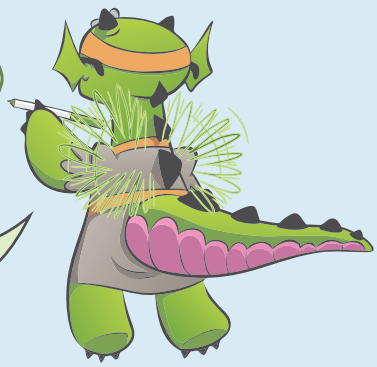


To get the n^{th} term, we have to add $(n-1)$ 7's.

Term: 1st 2nd 3rd 4th 5th ... 100th ... n^{th}

50, 57, 64, 71, 78, ... 743 ... $50+7(n-1)$

$50+(1\cdot7)=$ $50+(2\cdot7)=$ $50+(3\cdot7)=$ $50+(4\cdot7)=$ ... $50+(99\cdot7)=$



So, the n^{th} term is $50+7(n-1)$, which simplifies to $7n+43$.*

*TO SIMPLIFY $50+7(n-1)$, DISTRIBUTE THE 7 TO GET $50+7n-7$, THEN COMBINE LIKE TERMS TO GET $7n+43$.

199, 298, 397, 496, ...

13, 5, −3, −11, −19, ...

$\frac{1}{6}, \frac{1}{4}, \frac{1}{3}, \frac{5}{12}, \frac{1}{2}, \ldots$

Try it.

We can find the common difference in an arithmetic sequence by subtracting any term from the next term.

The common difference is 99.

$+99 \quad +99 \quad +99$

$199, 298, 397, 496, \ldots$

In this sequence, the numbers are decreasing!

Each number is 8 less than the one before it.

We can add -8 to get the next term, so the common difference is -8.

$-8 \quad -8 \quad -8 \quad -8$

$13, 5, -3, -11, -19, \ldots$

This one looked hard at first...

...until I changed all of the fractions into twelfths.

The common difference is $\frac{1}{12}$.

$\frac{1}{6}, \frac{1}{4}, \frac{1}{3}, \frac{5}{12}, \frac{1}{2}, \ldots$

$\frac{2}{12}, \frac{3}{12}, \frac{4}{12}, \frac{5}{12}, \frac{6}{12}, \ldots$

$+\frac{1}{12} \quad +\frac{1}{12} \quad +\frac{1}{12} \quad +\frac{1}{12}$

Perfect. Use these common differences to compute the 21st term of each sequence.

$+99 \quad +99 \quad +99$

$199, 298, 397, 496, \ldots$

$-8 \quad -8 \quad -8 \quad -8$

$13, 5, -3, -11, -19, \ldots$

$+\frac{1}{12} \quad +\frac{1}{12} \quad +\frac{1}{12} \quad +\frac{1}{12}$

$\frac{1}{6}, \frac{1}{4}, \frac{1}{3}, \frac{5}{12}, \frac{1}{2}, \ldots$

Try it.