

Patterning.

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Patterning is a necessity in algebra! With the use of the FX82AU+II students can explore the concepts of sequencing, pattern spotting (predicting) and connecting variables (forming equations).

Using the [Ans] key along with the [+], [-], [×] and [÷] keys to discover patterns in number.

Example 1: Generate the sequence $\langle 1, 3, 5, 7, \dots \rangle$ on the calculator.

Answer: Notice that the first term is 1 and the terms increase at a constant value of 2, from one term to the next.

Enter 1 into the calculator and press [=].

Now, enter 2 [+] [Ans] and then press [=] [=] [=] [=] [=] [=] ...

Math ▲

1
1

Math ▲

2+Ans
3

Math ▲

2+Ans
5 ...

Example 2: Generate the sequence $\langle 100, 93, 86, 79, \dots \rangle$ on the calculator.

Answer: Notice that the first term is 100 and the terms decrease at a constant value of 7, from one term to the next.

Enter 100 into the calculator and press [=].

Now, enter -7 [+] [Ans] (or [Ans] + -7) and then press [=] [=] [=] [=] ...

OR

Enter 100 into the calculator and press [=].

Now enter [Ans] [-] 7 and then press [=] [=] [=] [=] ...

Math ▲

100
100

Math ▲

-7+Ans
93

Math ▲

-7+Ans
86

Example 3: Generate the sequence $\langle 3, 6, 12, 18, \dots \rangle$ on the calculator.

Answer: Notice that the first term is 3 and the terms increase at a value of 2 times the previous term.

Enter 3 into the calculator and press [=].

Now, enter 2 [×] [Ans] (or [Ans] [×] 2) and then press [=] [=] [=] [=] ...

Math ▲

3
3

Math ▲

Ans×2
6

Math ▲

Ans×2
12 ...

Example 4: Generate the sequence $\langle 200, 50, 12.5, 3.125, \dots \rangle$ on the calculator.

Answer: Notice that the first term is 200 and the terms decrease at a value of 1/4 times the previous term.

Enter 200 into the calculator and press [=].
Now, enter 1/4 [×] [Ans] and then press [=] [=] [=] [=] ...

OR

Enter 200 into the calculator and press [=].

Now, enter [Ans] [÷] 4 and then press [=] [=] [=] [=] ...

Math ▲

200
200

Math ▲

$\frac{1}{4}$
 $\frac{1}{4}$

Math ▲

$\frac{1}{4} \times \text{Ans}$
50



Try these using only the [Ans] key along with the [+], [-], [×] and [÷] keys:

1. $\langle 2, 5, 8, 11, \dots \rangle$
2. $\langle 30, 25, 20, 15, \dots \rangle$
3. $\langle 5, 15, 45, 135, \dots \rangle$
4. $\langle 70, 7, 0.7, 0.007, \dots \rangle$
5. $\langle -5, -4, -1, 2, \dots \rangle$
6. $\langle 9, 1, -7, -15, \dots \rangle$
7. $\langle 2.3, 6.9, 20.7, 62.1, \dots \rangle$
8. $\langle 2, -6, 18, -54, \dots \rangle$

Working space:

Find the missing numbers in the following sequences, using only the [Ans] key along with the [+], [-], [×] and [÷] keys:

1. $\langle \square, 3, 14, 25, \dots \rangle$
2. $\langle 15, \square, 29, 36, 43, \dots \rangle$
3. $\langle 2, \square, 32, 128, 512, \dots \rangle$
4. $\langle 0.2, \square, 3.2, -12.8, 51.2, \dots \rangle$

Working space:

Problem solving:

Think of two numbers between 1 and 9 inclusive. Write them one on top of the other, like this:

5
7

Add these two numbers together, writing the answer underneath, like this:

5
7
12

Now, ignoring the first number add the 2nd and 3rd together like this:

5
7
12
19

Now, ignoring the first number add the 3rd and 4th together like this:

5
7
12
19
31

Repeat this process until you have 10 numbers, like this:

5
7
12
19
31
50
81
131
212
343

Question: What is the sum of all of these 10 numbers you have generated?

Hint: Using algebra: 1st number is 'a' and the 2nd number is 'b'. Then the 3rd number is 'a + b', the 4th is 'a + 2b', the 5th is '2a + 3b', ... Can you find a quick way to add up your 10 numbers?