

# Writing Pattern Rules

**Goal**

Use rules to extend patterns and write pattern rules.

1. Steve learned that a year on Venus is about seven Earth months long.

- a) Complete the table for Venus.

Venus	
Number of years on Venus	Number of months on Earth
1	7
2	
3	
4	

- b) Write a pattern rule to calculate the number of Earth months in any number of years on Venus.

- c) Use your pattern rule to calculate the approximate number of Earth months in 12 years on Venus.  
about 84 months

2. Bev saves \$12 each month from her paper route.

- a) Write a pattern of numbers that shows the amount Bev saves in 1 to 4 months.

Number of months	Amount
1	
2	
3	
4	

- b) Write a pattern rule to calculate the amount she saves in any number of months.

- c) Use your pattern rule to calculate the amount Bev saves in 10 months.

- d) Bev wants to buy a new hockey jersey for \$100. For how many months does she need to save?

**At-Home Help**

A **pattern** is a group of numbers, shapes, or objects that follow a rule while repeating or changing.

To extend a pattern you can use a table or a pattern rule that relates the term number to the pattern rule.

A **term number** is the number that tells the position of an item in a pattern.

For example, the pattern 2, 4, 6, 8, 10, ... can be shown in a table like this:

Term number	Number in pattern
1	2
2	4
3	6
4	8
5	10

A pattern rule to get any number in the pattern is multiply 2 by the term number.

$$\begin{aligned} 10\text{th term} &= 2 \times 10 \\ &= 20 \end{aligned}$$

## Variables in Expressions

Goal

Use variables in an expression.

3. Arpita is baking cookies for a school bake sale. One batch of cookies uses 75 g of chocolate chips.

- a) Calculate the number of grams of chocolate chips in the first four batches of cookies.

Suggested answer:

Batch number	Number of grams of chocolate chips
1	
2	
3	
4	

- b) Write an explicit pattern rule for the number of grams of chocolate chips in the 10th batch.
- c) Write your pattern rule using a variable for the batch number. Use the variable  $b$ .
- d) Calculate the number of grams of chocolate chips in the first four batches using your answer in part c). Show your work.
- e) How many grams of chocolate chips does Arpita need to make 11 batches of cookies?

## At-Home Help

A **variable** is a letter or symbol that is used to show a quantity. This quantity can have different values.

For example,  $t$  is a variable that could be used to represent the amount of time you surf the Internet each day.

Variables are usually used when writing explicit pattern rules to make the rules easier to write.

For example, an explicit pattern rule for the pattern 50, 100, 150, 200, ... is  $50 \times n$ . The variable  $n$  is the term number.

Term ( $n$ )	Value ( $50 \times n$ )
1	$50 \times 1 = 50$
2	$50 \times 2 = 100$
3	$50 \times 3 = 150$

4. Graph the Patterns of #1, #2, #3