

# MathFLIX CHALLENGE

## Using Factorials

Study the clues in this table and after completing it, notice how much you learned about factorials!

Reminder: the factorial of a number is the product of all positive numbers less than or equal to that number.

n!	Multiplication Form	Standard Form
1!		1
2!		
3!		
	4 x 3 x 2 x 1	
	5 x 4 x 3 x 2 x 1	
	6 x 5 x 4 x 3 x 2 x 1	
		40,320
		362,880

Use the table you created above to answer the following questions.

Problem	Computation	True or False
$2! + 2! = 4!$	$(2 \times 1) + (2 \times 1) = 4 \times 3 \times 2 \times 1$	
$3! \times 3! = 9!$		
$1! + 4! + 5! = 145$		

## Factorials and Permutations

It is useful to understand factorials so you can do permutation or order problems easily. For example, Ann, Ben and Joe are racing. In how many different orders can they finish?

Make a list: (Ann, Ben, Joe)  
 (Ann, Joe, Ben)  
 (Ben, Joe, Ann)  
 (Ben, Ann, Joe)  
 (Joe, Ann, Ben)  
 (Joe, Ben, Ann)

or  $3P_3$  or Use factorials.  $3! = 3 \times 2 \times 1$

Complete this table.

Permutation (order) Problems	Permutation Notation	Computation	Standard Form
Four 7 <sup>th</sup> grade classrooms compete at Field Day. In how many different orders can they finish?	$4P_4$	$4 \times 3 \times 2 \times 1$	
Six students enter the spelling bee. In how many different orders can they finish?	$6P$		
In how many orders can 4 cyclists finish?	$P$		