

MathFLIX CHALLENGE

Looking for Patterns in Powers and Bases

As you continue your math studies, you'll discover the incredible power of patterns. Learning about exponents and different bases are two areas where patterns will simplify your learning.

Find the missing products in the Table #1 to discover patterns that will help you complete Table #2 below.

Table #1

n^0	n^1 (base)	n^2 (square)	n^3 (cube)	n^4	n^5	n^6	n^7
1	1	1	1				1
1	2	4	8				125
1	3	9	27			729	2,187
1	4	16	64	256	1024		16,384
1	5	25	125	625			78,125
1	6	36	216	1296	7776	46656	279,936
1	7	49			16807	117649	823,543
1	8			4096	32768	262144	2,097,152
1	9	81	729	6561	59049	531441	4782969
1	10	100	1000				
1	11	121			161051	1771561	19487171
1	12			20736	248832	2985984	35831808

Table #2

n^n	Circle the Possible Ending Digits	# Circled	List of first 9 ending digits	Pattern: Palindrome or sum of 10 or neither
n^0	1, 2, 3, 4, 5, 6, 7, 8, 9, 0	1	1, 1, 1, 1, 1, 1, 1, 1, 1	palindrome
n^1	1, 2, 3, 4, 5, 6, 7, 8, 9, 0	10	1, 2, 3, 4, 5, 6, 7, 8, 9	sum of 10
	1, 2, 3, 4, 5, 6, 7, 8, 9, 0		1, 4, 9, 6, 5, 6, 9, 4, 1	
n^3	1, 2, 3, 4, 5, 6, 7, 8, 9, 0			
	1, 2, 3, 4, 5, 6, 7, 8, 9, 0			
	1, 2, 3, 4, 5, 6, 7, 8, 9, 0			
	1, 2, 3, 4, 5, 6, 7, 8, 9, 0			
	1, 2, 3, 4, 5, 6, 7, 8, 9, 0			

What powers create palindromes? _____

What powers create sums of 10? _____

Can you make predictions about palindromes or sums of 10 for n^8 , n^9 , n^{10} ?