
15-151 – EXCEL

Topic: **Induction**

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Academic Development

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Services available: Supplemental Instruction (SI), Academic Counseling in Study Skills, Individual & Walk-in Tutoring

1.

$$n \geq 1. \sum_{i=1}^n i^2 = \frac{1}{6}n(n+1)(2n+1)$$

2.

$$n \geq 1. \sum_{i=1}^n (2i-1)^2 = \frac{4n^3 - n}{3}$$

3.

$$n \geq 1. \sum_{i=1}^n \frac{1}{(3n-1)(3n+2)} = \frac{n}{6n+4}$$

4.

$$F_{n+1}F_{n-1} - F_n^2 = (-1)^n$$

5.

$$\sum_{i=1}^n F_i^2 = F_n F_{n+1}$$

6.

Determine which postage amounts can be created using the stamps of 3 and 7 cents. In other words, determine the exact set of positive integers n that can be written in the form $n = 3x + 7y$ with $x, y \in \mathbb{Z}^{\geq 0}$. (Hint: Check the first few values of n by hand, then use strong induction to show that, from a certain point n_0 onwards, all numbers have such a representation.)

Medium

	3	1					6	
6		9			7			1
8		7			3	4		
7	5			9			2	
2	1	8		4			3	
			8					
			4					3
	7		5	6				
		2				1	4	5

