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Conjecture

Using the expression 3a+5b you can get any positive integer as an answer besides 1,2,4,7 as long as a and b > 0.

you want ≥

Proof

For every number you multiply 3 by a pattern, (1,0,2,1,3) for the 5 there is also a pattern. This pattern however changes it starts with (0,1,0,1,0) for the first five numbers. Then the pattern changes to (2,1,0,2,1). It then keeps this general pattern and then add 1 to those five digits for the next 5 numbers. This pattern repeats infinitively. You cannot get the numbers 1,2,4, and 7 because 3 and 5 or 3+5 are not factors of 1,2,4 and 7.

Infinitely

Factors are for multiplying.

Example:

3a+5b

3(1) + 5(0) = 3	
3(0) + 5(1) = 5	
3(2) + 5(0) = 6	
3(1) + 5(1) = 8	
3(3) + 5(0) = 9	
3(0) + 5(2) = 10	Add 10, subtract 9 – subtracting three 3's and then adding two 5's
3(2) + 5(1) = 11	Add 6, subtract 5 – subtracting one 5 and then adding two 3's
3(4) + 5(0) = 12	Add 6, subtract 5 – subtracting one 5 and then adding two 3's
3(1) + 5(2) = 13	Add 10, subtract 9 – subtracting three 3's and then adding two 5's
3(3) + 5(1) = 14	Add 6, subtract 5
3(0) + 5(3) = 15	Add 10, subtract 9
3(2) + 5(2) = 16	Add 6, subtract 5
3(4) + 5(1) = 17	Add 6, subtract 5
3(1) + 5(3) = 18	Add 10, subtract 9
3(3) + 5(2) = 19	Add 6, subtract 5

For this pattern you are adding one to the sum by trading numbers in. For every 5 you take away you are adding 2 3's, for every 3 3's you take away you are adding 2 5's. By trading in numbers using this pattern, you are always adding one. This pattern works because you will always have enough 5s since every 5^{th} number is multiple of 5. Every time you reach a multiple of 5 you will have enough 5s. You can continue this pattern infinitely.

This is the key to your proof!

to start this process again.