Multiple Surprises

Can you find a few sets of ten consecutive numbers in which:

- the first is a multiple of 1
- the second is a multiple of 2
- the third is a multiple of 3
- the fourth is a multiple of 4
- the fifth is a multiple of 5
- the sixth is a multiple of 6
- the seventh is a multiple of 7
- the eighth is a multiple of 8
- the ninth is a multiple of 9
- the tenth is a multiple of 10?

You may be able to think of one set of ten numbers that meet these criteria, but remember that the problem asks you to find more than one set.

This is a hard problem, so you may want to read on...

When faced with a difficult problem, mathematicians sometimes simplify the problem, and as they work on the simplified version(s), try to gain some insights which might prove useful when they return to the original problem.

Here are some simpler problems involving consecutive numbers and multiples, which might help you prepare for tackling the original problem:

Can you find **sets of three consecutive numbers** where the first is a multiple of 1, the second is a multiple of 2, and the third is a multiple of 3?

Can you find several examples?
What do you notice? Have you any conjectures?

Do your conjectures apply in the following cases:

When the first number is a multiple of 2, the second is a multiple of 3 and the third is a multiple of 4?

When the first number is a multiple of 3, the second is a multiple of 4 and the third is a multiple of 5?

When the first number is a multiple of 4, the second is a multiple of 5, and the third is a multiple of 6?

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How about sets of **two consecutive numbers**, where the first is a multiple of 9, and the second is a multiple of 10? Or sets of four consecutive numbers? Or...?

Can you use what you have discovered to help you generate several sets of numbers that satisfy the criteria in each of the cases you've tried?

Can you use what you have discovered to help you answer the original question?