Solution to the "Breakpoint Challenge Problem"

We want an example where no reversal decreases the number of breakpoints. Note that if a reversal decreases the number of breakpoints, then after the reversal at least one end of the reversed segment does not have a breakpoint (why?); in other words, the reversal must bring together a pair of numbers that differ by 1. Also note that if n and $n + 1$ are not adjacent in a permutation, then there are precisely two ways to bring them together with a single reversal, namely "bring n to $n + 1$" or "bring $n + 1$ to n". (The reversed segments have the same length and are offset by 1 position.) For the permutation 0156723489 (3 breakpoints), we can consider all reversals that bring together two separated numbers that differ by 1. The possibiliites are:

bring 1 to 2: $0\underline{156}723489 \Rightarrow 0765123489$ (3 breakpoints)
bring 2 to 1: $01\underline{567}23489 \Rightarrow 0127653489$ (3 breakpoints)
bring 4 to 5: $015\underline{6723}489 \Rightarrow 0154327689$ (3 breakpoints)
bring 5 to 4: $01\underline{56723}489 \Rightarrow 0132765489$ (3 breakpoints)
bring 7 to 8: $0156\underline{723}489 \Rightarrow 0156432789$ (3 breakpoints)
bring 8 to 7: $01567\underline{23489} \Rightarrow 0156784329$ (3 breakpoints)