Q1 – Mathematically explain if each statement is true or false.

1. text 4n end text to the power of 4 space text = O end text open parentheses text 4n end text close parentheses
   text 4n end text to the power of 4 text  ≤ cn end text
   text 4n end text cubed space text ≤ c end text
   text Pick n end text subscript 0 text  = 1 such that n ≥ n end text subscript 0
   text 4 ≤ c, c can be set c = 4 end text
   text 4n end text to the power of 4 space text = 4n end text
   text This statement is true end text
   
2. text 100n end text cubed text  + 99n end text squared text  + 98n = O end text open parentheses text 100n end text cubed close parentheses
   text 100n end text cubed text  + 99n end text squared text  + 98n ≤ cn end text cubed
   text 100n +  end text fraction numerator 99 over denominator text n end text end fraction text  +  end text fraction numerator text 98 end text over denominator text n end text squared end fraction text  ≤ c end text
   text Pick n end text subscript 0 text  = 1 such that n ≥ n end text subscript 0
   text 100 + 99 + 98 ≤ c, c can be set c = 298 end text
   text 100n end text cubed text  + 99n end text squared space text + 98n end text space text = 298n end text cubed
   text This statement is true end text
3. text 6n! = O end text open parentheses text log n end text close parentheses
   text 100n end text cubed text  + 99n end text squared text  + 98n ≤ cn end text cubed
   text 100n +  end text fraction numerator 99 over denominator text n end text end fraction text  +  end text fraction numerator text 98 end text over denominator text n end text squared end fraction text  ≤ c end text
   text Pick n end text subscript 0 text  = 1 such that n ≥ n end text subscript 0
   text 100 + 99 + 98 ≤ c, c can be set c = 298 end text
   text 100n end text cubed text  + 99n end text squared space text + 98n end text space text = 298n end text cubed
   text This statement is true end text