Please send any comments or criticisms to dwharder@alumni.uwaterloo.ca
with the subject ECE 250 Questions 1.4.
Assistances and comments will be acknowledged.

**1.4*a*** Taking out $2(n + 1)$, you are left with the sum from 2 to $2n$.

**1.4*b*** This is $\sum_{k=1}^{n} 3n - 2$, so use the same hint as in 1.4*a*.

**1.4*c*** Taking out $2 \times 3^{n+1}$ leaves you with the sum to $n$.

**1.4*d*** Use the property that $\binom{n+1}{k} = \binom{n}{k} + \binom{n}{k-1}$.

**1.4*e*** Use the property mentioned in 1.4*d* and split the result into three sums, at which point you can use the property that $\sum_{k=0}^{n} \binom{n}{k} = 2^n$.

**1.4*f*** This one is essentially identical to the one without the $(-1)^k$ in front.

**1.4*g*** Expand the formula for $n + 1$ to get the formula for $n$ plus a component divisible by 2.

**1.4*h*** The formulas are equal when $n = 0$, and after that the differences grow.

**1.4*i*** Take out the $(n + 1)^2$ factor to be left with a similar sum to $n$..

**1.4*j*** Similar to 1.4*i*.

**1.4*k*** They are equal for $n = 1$ and after that, one difference grows slower than the other.

**1.4*l*** Similar to 1.4*g*.

**1.4*m*** Use $\left|\sum_{k=1}^{n+1} x_k\right| = \left|x_{k+1} + \sum_{k=1}^{n} x_k\right|$.

**1.4*n*** Similar to 1.4*i*.

**1.4*o*** Similar to 1.4*g*.

The remaining questions are left to the reader.