

# Write up for Partial Sums

Robert Ebanks

February 8, 2019

Part 1: This is the first sequence. The first fifteen terms are [0.40235948 0.68970891 0.94375743 1.11443081 1.23193023 1.31644588 1.37940842 1.42756321 1.46512094 1.49484331 1.51861749 1.53777745 1.55329314 1.56588672 1.57610687]

The last fifteen terms are [1.45168198 1.44910236 1.44653845 1.4439902 1.44145758 1.43894053 1.43643898 1.43395287 1.43148211 1.42902665 1.42658638 1.42416122 1.42175109 1.41935589]

This is the second sequence. The first fifteen terms are [1.01004912e+00 9.96288305e-04 1.74507837e-05 9.92590387e-07 1.07649602e-07 1.75607259e-08 3.79679424e-09 1.00888133e-09 3.13803192e-10 1.10515946e-10 4.30368611e-11 1.82094771e-11 8.26073910e-12 3.97662434e-12 2.01476699e-12]

The last fifteen terms are [1.06775107e-19 9.60736957e-20 8.65591128e-20 7.80875768e-20 7.05341461e-20 6.37900700e-20 5.77605371e-20 5.23627570e-20 4.75243241e-20 4.31818184e-20 3.92796079e-20 3.57688211e-20 3.26064642e-20 2.97546614e-20]

This is the third sequence  $((i^5)/2i)$ . The first fifteen terms are [5.0000e-01 4.0000e+00 1.3500e+01 3.2000e+01 6.2500e+01 1.0800e+02 1.7150e+02 2.5600e+02 3.6450e+02 5.0000e+02 6.6550e+02 8.6400e+02 1.0985e+03 1.3720e+03 1.6875e+03] The last fifteen terms are [318028. 329251.5 340736. 352484.5 364500. 376785.5 389344. 402178.5 415292. 428687.5 442368. 456336.5 470596. 485149.5]

Part 2: The second(at first glance) is the only one that may converge, because it appears to be decreasing, and summing the first hundred terms gives a number barely over one but running the same simulation over 10000 times instead of 100 gives an answer well over 200,000 (I "wrote" the program twice with a different number of iterations for each) So my guess would be that none converge.

Part 3: N/A

Part 4: I used 100 at the beginning just because it was the first "large" number I thought of then 10,000 because I had no idea if putting in a number too large would break anything.(i.e. spyder, my processor, etc)