(4.7) With eqn. (4.17) determine the atomic number corresponding to maximum stability for A = 10, 27, 59, and 239. Compare these results with the isotope chart, Appendix C.

Use eqn. (4.17) and parameter values from below eqn (4.15) to calculate Z for the given A-values. Neglect odd-even effects:

$a_a := 23$ $a_c := 0.72$

$A := 10$ $Z := \frac{2 \cdot A}{4 + \left(\frac{a_c}{a_a}\right) \cdot A^{\frac{2}{3}}}$ $Z = 4.8$ ^{10}B stable (from nuclide chart)

$A := 27$ $Z := \frac{2 \cdot A}{4 + \left(\frac{a_c}{a_a}\right) \cdot A^{\frac{2}{3}}}$ $Z = 12.6$ ^{27}Al stable

$A := 59$ $Z := \frac{2 \cdot A}{4 + \left(\frac{a_c}{a_a}\right) \cdot A^{\frac{2}{3}}}$ $Z = 26.4$ ^{59}Co stable

$A := 239$ $Z := \frac{2 \cdot A}{4 + \left(\frac{a_c}{a_a}\right) \cdot A^{\frac{2}{3}}}$ $Z = 91.8$ ^{239}U unstable, ^{239}Np unstable ^{239}Pu least unstable