Answers to problem set questions not in the back of the book

8.43 (a) Cl is smaller than Cl^-. An atom gets bigger when more electrons are added.
(b) Na^+ is smaller than Na. An atom gets smaller when electrons are removed.
(c) O^{2-} is smaller than S^{2-}. Both elements belong to the same group, and ionic radius increases going down a group.
(d) Al^{3+} is smaller than Mg^{2+}. The two ions are isoelectronic (What does that mean? See Section 8.2 of the text) and in such cases the radius gets smaller as the charge becomes more positive.
(e) Au^{3+} is smaller than Au^+ for the same reason as part (b).
In each of the above cases from which atom would it be harder to remove an electron?

8.119 Z_{eff} increases from left to right across the table, so electrons are held more tightly. (This explains the electron affinity values of C and O.) Nitrogen has a zero value of electron affinity because of the stability of the half-filled 2*p* subshell (that is, N has little tendency to accept another electron).

8.127 Both ionization energy and electron affinity are affected by atomic size − the smaller the atom, the greater the attraction between the electrons and the nucleus. If it is difficult to remove an electron from an atom (that is, high ionization energy), then it follows that it would also be favorable to add an electron to the atom (large electron affinity).
Noble gases would be an exception to this generalization.