

## Exercise 8.4

### Drawing Resonance Structures

1. Draw all valid resonance structures for each of the ions listed below.  
*Include any non-zero formal charges on the appropriate atoms.*
  - (a)  $\text{NO}_2^-$
  
  
  
  
  
  
  
  
  
  
  - (b)  $\text{NO}_3^-$
  
  
  
  
  
  
  
  
  
  
2. Consider the Lewis diagrams you drew for the nitrite ( $\text{NO}_2^-$ ) and nitrate ( $\text{NO}_3^-$ ) ions.
  - (a) Calculate the average N-O bond order for each ion.
  
  
  
  
  
  
  
  
  
  
  - (b) Compare the average N-O bond length for each ion.
  
  
  
  
  
  
  
  
  
  
3. Do your best to draw an “averaged out” Lewis diagram for each of these two ions to show their true properties.  
*If you find an important feature too difficult to draw, describe it instead.*
  - (a)  $\text{NO}_2^-$
  - (b)  $\text{NO}_3^-$