MAT 3730 Homework

Evaluate each of the following integrals. You should be able to do all of these using theorems from class; virtually no computations should be needed other than partial fractions, but please clearly explain/justify all of your answers.

1. a. \[ \int_{c[0,1]} \sin zdz \]  
   b. \[ \int_{c[0,3]} e^{3z}dz \]

2. \[ \int_{c[0,1]} \frac{z - 3}{z^2 + 2z + 2}dz \]

3. a. \[ \int_{c[0,2]} \left( z + \frac{1}{z} \right)dz \]  
   b. \[ \int_{c[0,2]} \left( z + \frac{1}{z^2} \right)dz \]

4. a. \[ \int_{c[0,1/2]} \frac{2z+1}{z^2 + z}dz \]  
   b. \[ \int_{c[0,2]} \frac{2z+1}{z^2 + z}dz \]  
   c. \[ \int_{c[3,1]} \frac{2z+1}{z^2 + z}dz \]

5. a. \[ \int_{c[5,2]} \frac{-3z + 2}{z^2 - 8z + 12}dz \]  
   b. \[ \int_{c[0,9]} \frac{-3z + 2}{z^2 - 8z + 12}dz \]

6. \[ \int_{c} \frac{8z - 3}{z^2 - 2}dz \] , where \( C \) is the curve shown below.