1. (a) Prove all of the results about $A^{1/2}$ and $A^{-1/2}$ in box with equation (2-22).
(b) For $A^{-}$ defined as

$$A^{-} = \sum_{i: \lambda_i > 0} \frac{1}{\lambda_i} e e'$$

(a generalized inverse) evaluate

$$A^{-}AA^{-} \text{ and } AA^{-}A$$

2. Prove the singular value decomposition, Theorem 2A.15

3. Review of basic expectation properties.
   (a) Exercise 2.28
   (b) Exercise 2.30
   (a) Exercise 2.40

4. **Computer Assignment** Using the national track data in Table 1.9, make a multiple scatter plot and find the eigenvectors and eigenvalues of $S_n$. (see web site for R program— if use MINITAB or SAS could use divisor $n - 1$ but see SAS program on web site.)