Exercise 7.4

In an investigation of the general moral in a school class, Hartshorne and May* have found the following correlations between outcomes of 3 possibilities which measure the degree of dishonesty in situations involving "copying", "help" and "looking over the shoulder":

$$\begin{pmatrix} 1 & 0.4 & 0.4 \\ 0.4 & 1 & 0.4 \\ 0.4 & 0.4 & 1 \end{pmatrix}$$

1. Find the linear combination of the possibilities which describes the largest possible fraction of the total variation and give the fraction.

2. Give a verbal interpretation of the linear combination.

* Probably quoted from H. Hartshorne and M. A. May: Studies in the Nature of Character (MacMillan, New York 1928).