B.13 (a) If S and R are independent then

$$\mathrm{E}\left[SR\right] = \mathrm{E}\left[S\right]\mathrm{E}\left[R\right] = -1 \times 2 = -2.$$

(b) In general,

$$\mathrm{Cov}(S,R) = \mathrm{E}\left[SR\right] - \mathrm{E}\left[S\right]\mathrm{E}\left[R\right]$$

and hence

$$\mathrm{E}\left[SR\right] = \mathrm{Cov}(S,R) + \mathrm{E}\left[S\right]\mathrm{E}\left[R\right].$$

By definition of correlation we have

$$\mathrm{Cov}(S,R) = \sqrt{\mathrm{Var}(S)\mathrm{Var}(R)}\mathrm{Corr}(S,R) = \sqrt{8} \times 0.15 = 0.42,$$

and consequently

$$\mathrm{E}\left[SR\right] = 0.42 - 2 = -1.58.$$