1. (a) Impossible. B has a lower beta than A but a higher return.
(b) Possible.
(c) Impossible. Portfolio A has a higher expected return than the market, and so must have a beta bigger than one, and hence a higher standard deviation than the market. But it doesn’t.
(d) Impossible. Portfolio A has a beta bigger than 1, but an expected return smaller than the market.
(e) Impossible. Portfolio A must have a beta of 0.75 to match its expected return. Hence its standard deviation must be at least 0.18.

2. (a) The variance of any stock is \((0.16 \times 0.16) + (0.32 \times 0.32)\). Hence, the standard deviation of any individual stock is 0.35777.
(b) The covariance of any two stocks is \(0.16 \times 0.16\). Hence, the correlation between any two stocks is:
\[
\frac{0.16 \times 0.16}{(0.16 \times 0.16) + (0.32 \times 0.32)} = 0.2
\]
(c) With \(n\) stocks the standard deviation is:
\[
\sqrt{0.16^2 + \frac{0.32^2}{n}}
\]
So for 5 stocks, this is 0.214663. The expected return is 10 percent.
(d) The minimum portfolio size to get the standard deviation below 18 percent is 16 stocks.
(e) The slope of the capital allocation line is the Sharpe ratio of the market portfolio which is \(\frac{0.1 - 0.02}{0.16} = \frac{1}{2}\).

3. The portfolio beta is 0.6*1.2+0.4*0.6=0.96. Therefore the expected return is 3+1.08*(6-3)=5.88\%.
4. (a) The highest beta is fun (entertainment) at 1.42. The lowest beta is smoke (tobacco) at 0.63.
(b) Here is the scatter plot:

![Expected Return and Beta](image)

The relationship is positive but very weak.