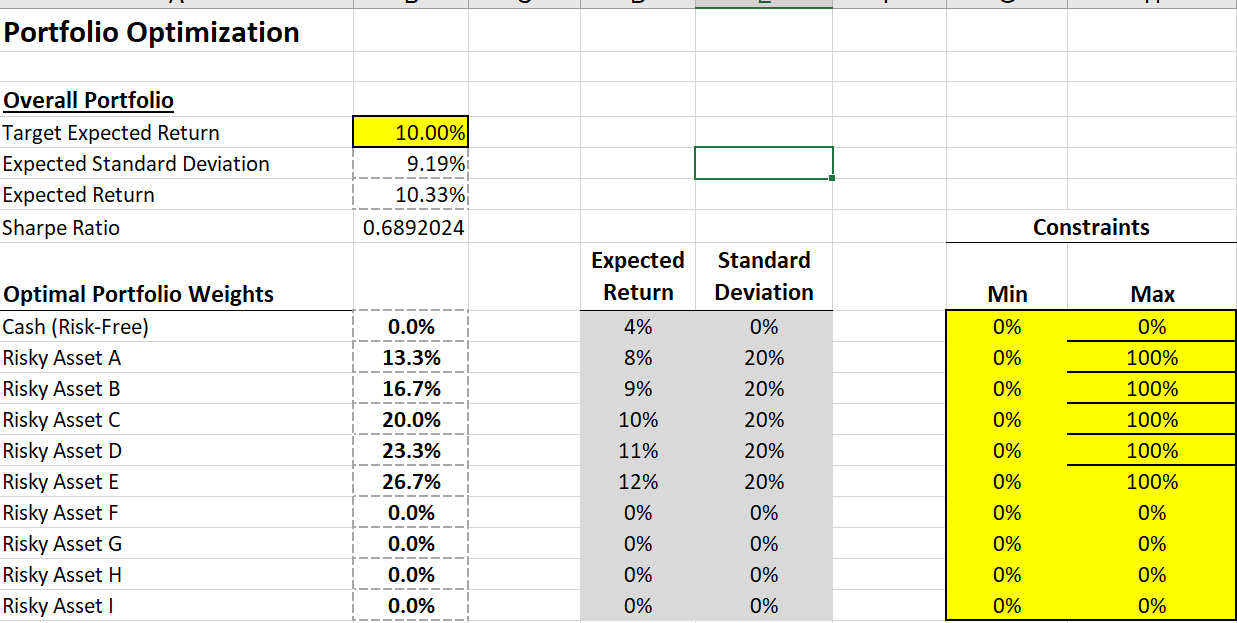
1(a). By running Portfolio Optimizer with the constraints that set cash holdings to be zero and the objective to maximize the Sharpe Ratio, the OCRA portfolio weights are as below:



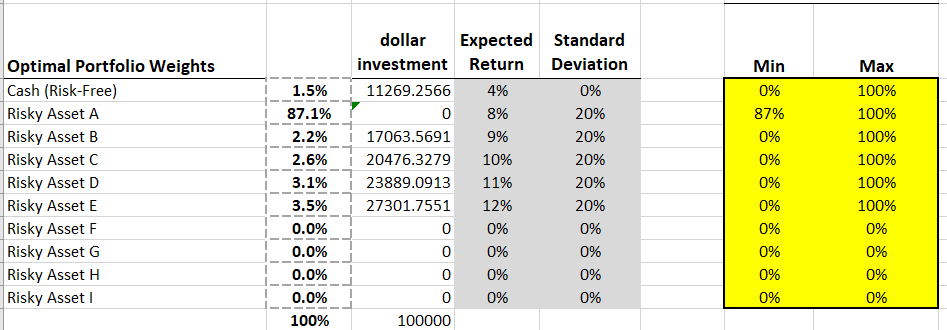
As for the dollar investment, Jane will invest $13,333 in A, $16,667 in B, $20,000 in C, $23,333 in D, $26,667 in E

(b) If she maintained the allocation:

Her additional wealth through endowment = $100,000 \* $10 / (1+4%)^10 = $675,564

effectively she invests $675,564 + $13,333 = $688,897 in A, $16,667 in B, $20,000 in C, $23,333 in D, $26,667 in E.

By restricting expected return equaling the target return (8.25%) and setting the target as minimizing expected standard deviation, and the additional constraint that she has to hold at least 87% (PV of endowment value / total wealth) the solver outputs solution as follows:

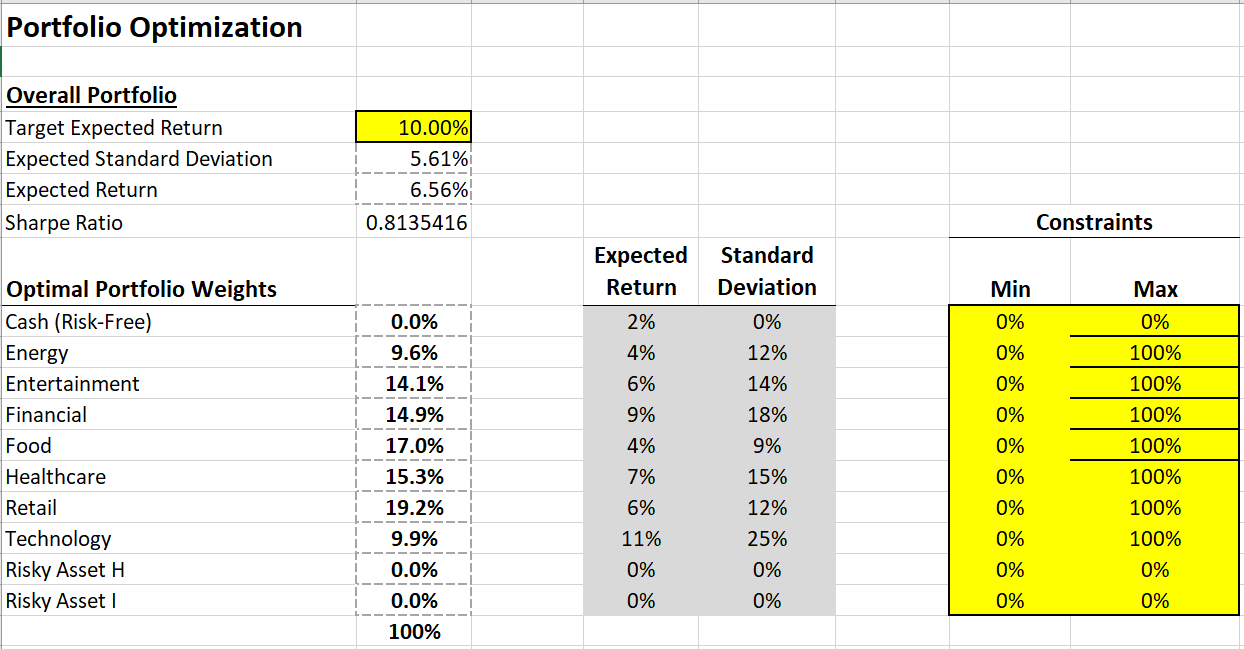


*(Here we define dollar investment as how she currently invests with her cash)*

(c) She can enter forward market to settle a selling of the stock A from endowment at the time of her 35th birthday. But finding a counterparty & transaction cost might deter her from doing so.

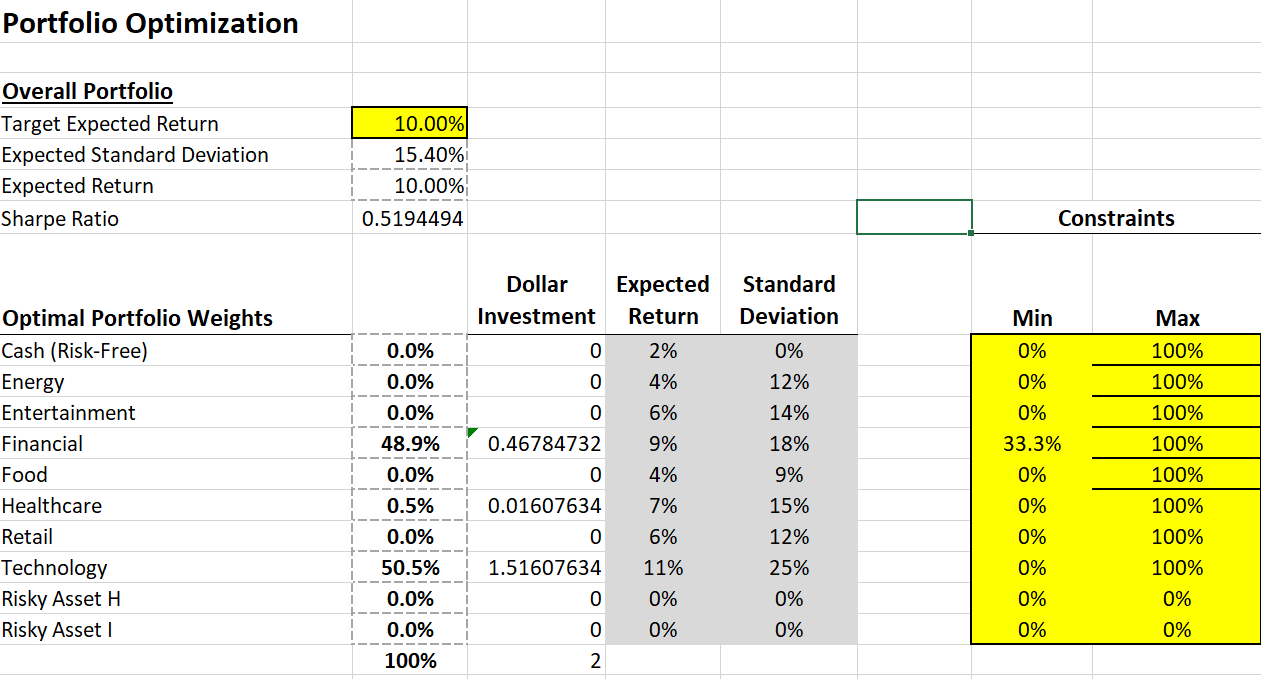
2.

(a) OCRA portfolio is as follows, by setting cash holdings = 0 and maximize Sharpe Ratio:



(b)

Jane has total wealth of $3 million. Her optimal investment is, by the portfolio optimizer:



(*Dollar investments in Financial sector = $3m \* weight - $1m, while other sectors are simply $3m \* weights. Here I define dollar investment as the investment from savings.*)

(c) Using similar approach:

