## 2220 - Entrepreneurial Finance and Venture Capital Problem set 2

## Q1.

Which of the following actions would decrease a firm's asset intensity?

- Renting computing capacity from Amazon instead of buying its own servers
- Paying suppliers within 30 days instead of 60 in exchange for a discount
- Reducing the growth rate of sales from 25% to 10%
- Lowering the amount of inventory held as a percentage of sales
- Allowing customer service representatives to work from home instead of the office, assuming the firm rents its office space
- Eliminating a free trial month for new subscribers

## Q2.

Heuristic Algorithms is a startup offering automated personal assistant services based on its proprietary artificial intelligence technology. It generated \$2 million in sales in 2016, with an operating loss of (\$500,000). In January 2017, Arthur Clarke, the CEO, is seeking \$5 million in funding to invest in improving the assistant's learning capabilities. Clarke expects the company to achieve \$25 million in sales by 2021, followed by 5 years of 40% revenue growth and 3% growth thereafter. He projects that the company will become profitable in 2021, with EBIAT margins of -15% over the next 5 years, 4% for the following 5 years and 8% thereafter. Asset intensity is expected to remain constant at -15%.

- a) Stefanie Powers of Athena Venture Partners is considering investing the \$5 million. Her experience with other Software-as-a-Service (SaaS) startups suggests that Heuristic Algorithms could exit in December 2021 with a 4 to 6 price-to-sales trailing multiple. Assuming the company meets Clarke's projections, what is her projected exit value range for Heuristic Algorithms?
- b) Use a 3 stage model to estimate Heuristic Algorithms' value in 2021, using Clarke's projections and a cost of capital of 10%. Does the multiple range assumed by Powers make sense given the company's projected cash flows?
- c) How should a forecast of lower growth or higher asset intensity impact the appropriateness of Powers' projected multiple?
- d) What share of the company will she require in January 2017 if she is targeting an annual rate of return of 50% and she anticipates the company will be sold in December 2021 for \$125 million? What is the implied pre and post-money valuation if she invests on those terms?
- e) The company has 1 million shares outstanding before the investment, owned by the founders. How many shares should she purchase and at what share price?

f) Suppose there are only two possible scenarios for Heuristic Algorithm: the company will either exit for \$125 million or fail and be worth \$0. If 10% is the true cost of capital, what probability of failure is Powers implicitly assuming?

Powers believes that in order to create appropriate incentives for key employees Clarke will have to grant stock options worth 15% of the company by the end of year 5.

g) What share of the company would Powers demand today if this option pool is created after her investment and her required rate of return is 50%?

As their negotiations progress, they conclude that the company will require two additional rounds of investment. By their estimates, Heuristic Algorithms will need to raise \$3 million in January 2019 and a further \$2 million in January 2020. They are still planning to sell the company in December 2021 for \$125 million.

Each round will be raised with a different VC. Powers is still targeting a 50% return, while the second and third VCs will target a 40% and 30% return respectively. Assume there is no option pool.

- h) What exit stakes will each investor require?
- i) What stakes will each investor require at the time of their investment?
- j) What is the pre-money and post-money valuation at each round?
- k) What is the share price in each round?
- 1) Create a cap table showing the pre and post-money valuation, equity stakes, number of shares and share price for each round.