ADS4293 LAB1

Spreadsheet Modeling – Practice Problems

11 September, 2025

LAB SETUP

- Excel file will be emailed at the beginning of the lab
- We'll go over one question at a time
- 10–15 minutes for you to solve in pairs or individually
- I'll put a slide with formulas to help you
- After that, I'll go over it
- Submit your **Excel file** on *Brightspace (Owl)* at the end of the lab
- Today's lab has 4 questions — goal is to finish them all within 2 hours

QUESTION 1

1. Fatima wants to begin planning for her retirement. She wants to determine how much she will have saved for retirement by depositing $1,000 per month, every month for the next 30 years, at a monthly interest rate of 0.6 per cent.

$$\text{Savings at Retirement} = \text{Monthly Deposit}\left(\frac{(1+\text{Monthly Interest Rate})^{\text{Months Until Retirement}}-1}{\text{Monthly Interest Rate}}\right)$$

   a. Build a spreadsheet model that Fatima could use to calculate her retirement savings in 30 years with inputs that include Monthly Deposit, Monthly Interest Rate, and Months Until Retirement.
   b. Test the model to ensure that it works correctly.

SECTION 1 Reproduction

QUESTION 1- FORMULAS

Inputs:

- Monthly deposit
- Months until retirement
- Monthly interest rate

Output:

- Retirement Savings (use formula)

QUESTION 1- TEST YOUR MODEL

1. Fatima deposits $1,000 per month for 360 months (30 years) at a 1.0% monthly interest rate.
2. Fatima deposits $1,500 per month for 360 months (30 years) at a 0.6% monthly interest rate.
3. Fatima deposits $1,000 per month for 480 months (40 years) at a 0.6% monthly interest rate.
4. Fatima deposits $1,500 per month for 480 months (40 years) at a 0.7% monthly interest rate.

Task: Pick one case and calculate the retirement savings your model produces

QUESTION 2

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2. Hameed owns a woodworking shop where he builds picnic tables and Muskoka chairs. He charges $250 for picnic tables and $80 each for Muskoka chairs. It costs him $105 in materials and $50 in labour to build a picnic table. It costs $30 in materials and $30 in labour to build a Muskoka chair. Demand for picnic tables is relatively constant at 30 tables per summer season. Demand for Muskoka chairs increases with his investment in advertising. Based on his past experience, he believes that the relationship between advertising and demand for Muskoka chairs is as follows:

$$\text{Demand} = \frac{125}{1 + 5e^{-0.005\,\text{AdvertisingSpend}}}$$

   a. Build a spreadsheet model that can assist Hameed in making a decision about how much to invest in advertising.
   b. Test the model to ensure that it works correctly.

QUESTION 2- FORMULAS

- Advertising Spend → can be changed (leave empty for now) to get the baseline demand
- Fixed picnic-table demand
- Use demand formula for Muskoka chair

- **Revenue** = Units * SellingPrice
- **Total Costs** = Total COGS + Advertising Spend
- **Profit =** Total Revenue - Total Costs

QUESTION 2- TEST YOUR MODEL

1. If Hameed invests $100 in advertising, what is the chair demand and the profit?
2. If Hameed invests $250 in advertising, what is the chair demand and the profit?
3. If Hameed invests $400 in advertising, what is the chair demand and the profit?
4. If Hameed invests $500 in advertising, what is the chair demand and the profit?

Task: Pick one case and calculate the retirement savings your model produces

QUESTION 3

3. Riina owns a teak furniture shop. She is considering three promotional strategies for September. Option A is newspaper advertisements for a "blow-out sale" in which everything in the store is 15 per cent off. Option B is a promotional spot on the local television network, *The Home and Style Network*, focused on restyling your dining space. Option C is not to invest in any new promotional activities. With no investment in promotional activities, Riina expects to sell five bedroom sets, three dining room sets, four china cabinets, and eight patio sets. Riina sells bedroom sets for $4,500, dining room sets for $3,500, china cabinets for $4,000, and patio sets for $1,500. The furniture sold at Riina's store is top quality. She purchases bedroom sets for $2,500, dining room sets for $2,000, china cabinets for $2,000, and patio sets for $750. Her business has monthly fixed costs of Operations and Salaries totalling $20,000. Advertising in the newspaper costs $3,000, but two years ago when she used this strategy, she sold one more bedroom set, two more dining room sets, no increased amount of china cabinets, and six more patio sets than she had expected. A promotional spot on *The Home and Style Network* costs $4,000 and Riina expects it would result in the sale of four additional dining room sets and three additional china cabinets.
   a. Develop a spreadsheet model that can assist Riina in making a decision.

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QUESTION 3- FORMULAS

Revenue = Units Sold*Selling Price *or* **Revenue** = Units Sold*Discounted Price

Cost = Units Sold*Purchase Cost

Total Costs = TotalVariableCosts + FixedCosts + PromotionCost

Profit = Total Revenue – Total Costs

QUESTION 4

5. FILE ***Specs.*** Righetti Homes, a custom home builder in Arizona, is currently offering three models in a newly developed residential neighborhood in Scottsdale. The accompanying spreadsheet includes the information about the three models, including selling prices, material costs, labor costs, buyer incentives (percent of the selling price), and average buyer upgrades (percent of the selling price). Righetti Homes plans to build 50 homes in the neighborhood, and it would like to estimate its total sales and profits in the new residential neighborhood.

   a. Build a spreadsheet model to help Righetti Homes estimate its total sales and profits in the new residential neighborhood. If Righetti Homes builds 10 Model A homes, what are the total sales, costs, and profits for these homes?

   b. Based on initial market analysis, Righetti Homes projects that it will build 15 model A homes, 25 model B homes, and 20 model C homes. What are the total sales and profits for Righetti Homes for the neighborhood?

QUESTION 4

Sales Formula:

- Sales = (Selling Price + Upgrades) × Units
    - Upgrades = Selling Price * Upgrade %

Costs Formula:

- Costs = (Materials + Labor + Incentives) × Units
    - Incentive Cost = Selling Price * Incentive %

Profit Formula:

- Profit = Sales – Costs

Thank you!