

This homework is intended for Learning Cycle 3, leading to Quiz 3.

For the quiz you will be provided with a table of the MACRS specified percentages, and the federal corporate tax tables, if needed. You will also receive the formulas and tables from Quizzes 1 and 2 if needed. For this homework you can find the MACRS percentages for accelerated depreciation at <https://www.irs.gov/publications/p946/ar02.html>, table A-1.

- Show that the tax burden on a corporation is the same if
  - the State tax is deductible from the Federal tax (the way it is and the way it was presented in lecture) or if
  - the Federal tax is deductible from the State tax.
- List the various ways that changing the depreciation method can affect the NPV of an investment opportunity.
- Give an example in which the DDB method gives a lower depreciation amount than the SL method in the 12<sup>th</sup> year.
- Your company purchased an asset that cost \$444,000. The asset is in the 10-year property class. There are two scenarios: Scenario 1, the asset is kept 12 years and then sold in year 12 for \$44,000; Scenario 2, the asset is kept 8 years and then sold early during year 8, for \$144,000. Use *both* MACRS methods with the half-year convention to compute depreciation expenses, year by year. There are four depreciation schedules for this problem: (two scenarios) x (two methods).
- Using the same data as in problem 4, compute the net cash proceeds from the sale of the asset, assuming a marginal tax rate for operating income of 35%. Again, there are (two scenarios) x (two methods).
- Your company purchased an asset that cost \$444,000, and had an expected salvage value of \$44,000 after 10 years of use. Compute the annual depreciation that would be taken, year-by-year, using classical or pre-1981 methods, without the half-year convention. The asset has a 10-year depreciation life, and it is kept this amount of time and then sold for \$44,000. Use the SL, SYD, and 200%DB methods.
- A company obtained a loan to help finance the asset. The question is how to repay the loan. There are two popular options: equal principal payments and equal total payments (the total of principal and interest is the same each year). *Prepare* loan repayment schedules for these two methods.

Amount borrowed	444,000	Annual loan interest rate	12%	Years to repay	10
-----------------	---------	---------------------------	-----	----------------	----

- A company purchased an asset to generate additional revenue. The first column shows the operating cash flow, which consists of additional revenues less additional cash expenses like labor, materials, rent, insurance, etc., but does not reflect non-cash expenses like depreciation. The asset was in the 10-year property class, and the depreciation method used was MACRS percentages. The selling price of the asset at the end of the project in year 11 was zero. The marginal tax rate for this large corporation is 35%. Determine the depreciation expense, taxable income, income tax, profit after tax, and after-tax cash flow, year-by-year, for this project. Use a table similar to the one below. Round off intermediate and final answers to nearest dollar. Time 0 is the beginning of year 1, time 1 is the end of year 1, etc.

time	Asset cost = 444,000		Marginal tax rate = 0.35			
	Optg. cash (Cash flow before taxes)	Eqpt. deprec.	Taxable income	Income tax	Profit after tax	Cash flow after tax
0						- 444,000
1	257,000					
2	269,000					
3	311,000					
4	325,000					
5	340,000					
6	350,000					
7	325,000					
8	310,000					
9	282,000					
10	190,000					
11	130,000					

9. A company purchased some assets at time 0 to generate additional revenue, and used a loan of \$500,000 to help finance the assets. The asset depreciation amounts are shown in the table (you don't know the depreciation methods, but you trust the accountant to determine the depreciation expenses correctly). Also, the amounts for loan principal and interest are shown, year-by-year. The loan repayment schedule is unusual, but don't worry about how it was obtained. One asset was sold during the fifth year, for \$70,000; the book value of that asset after taking the year 5 depreciation on it was \$15,000; its original purchase cost was \$55,000. The depreciation amount for that asset in year 5 is included in the depreciation expense shown in the table. The marginal tax rate for this large corporation is 35%; capital gains are taxed at 20%. Compute "income tax" and "cash flow after taxes, principal, and interest" for years 1- 5. Can you determine the loan interest rate? [Time 0 is the beginning of year 1, time 1 is the end of year 1, etc. The operating cash flow represents revenues minus labor and materials expenses.] This is a different example from the previous one, but some numbers may be similar.

time	Optg. cash (Cash flow before taxes)	Eqpt. deprec. expenses	Loan interest payments	Loan principal payments			
0							
1	257,000	90,000	65,000	60,000			
2	269,000	120,000	57,200	80,000			
3	311,000	130,000	46,800	100,000			
4	325,000	110,000	33,800	120,000			
5	340,000	80,000	18,200	140,000			

10. A company expects the following revenues and expenses during the next year. The state income tax rate is a flat 6% rate, and state taxes are a deductible item for federal tax calculations. Use the federal tax rate information from lecture, see slide 11 on the second page of the pdf file of the lecture notes.

Revenues	444,000
Expenses	
Labor	72,000
Equipment Depreciation	40,000
Materials	12,000
Supplies	33,000
Rent	76,000
Insurance	21,000

- If state income taxes were **zero**, what would be the **amount** of federal income tax?
  - If state income taxes were **zero**, what would be the **effective (average)** federal income tax **rate** for this company?
  - If state income taxes were **zero**, what would be the **marginal** federal income tax **rate**?
  - With state income taxes at the **flat rate given above**, what is the **amount** of state income tax?
  - With state taxes at the **flat rate given above**, what is the **amount** of federal income tax?
- Note that state income tax is a deductible expense on the federal tax return. The accountant would first prepare the state income tax return, ignoring federal income tax, and then prepare the federal income tax return.
- What is the **effective (average)** total tax rate (federal and state taxes combined) for this company?
  - What is the **marginal** tax rate (federal and state combined) for this company?

11. A division of a company expects revenues and expenses during the year 2015 as shown. In addition, the company borrowed an amount (see table) at the beginning of year 2013, to be repaid over a number of years (see table) with **equal payments** at the interest rate shown (the total of principal plus interest is the same each year). The **first** and **second** (years 2013 and 2014) payments on the loan have been made, and the **third** payment will be made in the year 2015. The company is a very large corporation with the marginal tax rate shown. Determine the cash flow after taxes, interest, and principal for the year 2015.

Revenues		880,000		Marginal tax rate	35%
Expenses				Amount borrowed	3,000,000
	Labor	166,000		Years to repay	15
	Equipment depreciation	44,000		Annual interest	11%
	Materials	15,000			
	Supplies	22,000			
	Rent	55,000			
	Insurance	11,000			