



2012

**North Carolina FFA Farm Business Management
JUNIOR Career Development Event**

Section II: Problem Solving (200 points) KEY

Read each problem carefully. The **main concept** of each problem is stated at the start of each problem. Read the entire problem before beginning work on that problem.

Section II contains six (6) problems. Check to see that you have 18 pages including the cover page. The point value for each of your answers is stated in parenthesis to the right of each blank or in the question text. You have 100 minutes to complete this section of the Career Development Event.

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2012 NC FFA JUNIOR Farm Business Management

Resource Information

Table 1. Statements of Net Worth

Resource Information for the Brouwer farm business, As of 12/31/2010 and 12/31/2011
2012 NC FFA Farm Business Management Career Development Event

	<u>12/31/10</u>	<u>12/31/11</u>
Assets		
<u>Current Assets</u>		
Cash in Farm Account	\$3,960	\$3,420
Farm Accounts Receivable	0	0
Stored Crops	3,500	8,800
Growing Crops	29,700	37,350
Other Current Assets	0	0
Total Current Assets	37,160	49,570
<u>Non Current Assets</u>		
Machinery & Buildings	140,911	139,386
Land (137 Acres)	335,650	342,500
Total Non-Current Assets	476,561	481,886
Total Farm Assets	\$513,721	\$531,456
Liabilities		
<u>Current Liabilities</u>		
Short Term Notes Payable	\$38,562	\$14,694
Accounts Payable	21,713	12,457
Portion of Machinery and Equipment Debt Due	13,500	13,275
Portion of Land Debt Due	48,600	43,740
Accrued Liabilities (taxes, rent)	0	2,000
Accrued Interest	1,200	0
Total Current Liabilities	123,575	86,166
<u>Non-Current Liabilities</u>		
Non-Current Liabilities Due after one year	296,000	247,400
Land Payment Due after One Year	39,846	37,656
Total Non-Current Liabilities	\$335,846	\$285,056
Total Farm Liabilities	\$459,421	\$371,222
Net Worth (Equity)	\$54,300	\$160,234

Table 2. Income Statements

Resource Information for the Brouwer farm business
2012 NC FFA Farm Business Management Career Development Event

	2010	2011
Revenue		
Leafy Greens	\$164,010	\$170,940
Onions & Garlic	202,350	210,900
Tomatoes	143,000	100,100
Melons	64,800	67,838
Strawberries	99,000	111,375
Farm Service Agency Payments	526	345
Total Revenue	\$673,686	\$661,498
Expenses		
Cash Operating Expenses		
Chemicals	\$114,134	\$129,683
Fertilizer & Lime	41,277	47,754
Freight/Trucking	5,488	5,568
Gas,Fuel,Oil	18,553	19,443
Insurance	98,003	78,336
Crop Insurance	9,083	9,026
Labor Hired	77,398	75,042
Machine Hire	3,004	2,907
Repairs-Mach	7,699	38,576
Repairs-Bldg	18,500	2,514
Seeds/Plants	48,917	52,396
Storage	8,863	7,046
Supplies	9,914	7,527
Taxes	30,798	30,699
Utilities-Farm Share	6,052	8,009
Miscellaneous Farm Expenses	10,742	10,026
Total Cash Operating Expenses	\$508,425	\$524,552
Inventory Adjustments		
Accounts Payable	14,656	-7,875
Change in Accrued Taxes	3,150	2,250
Other Accrued Expenses	1,125	1,350
Depreciation	13,320	12,150
Total Operating Expenses	\$580,093	\$542,052
Cash Interest Paid	14,812	26,082
Change in Interest Payable	0	0
Total Interest Expense	\$14,812	\$26,082
Total Expenses	\$594,905	\$568,134
Net Farm Income From Operations	\$7,281	\$43,314

Table 3. Onions & Garlic, owned, harvest & market

Resource Information for the Brouwer farm business, 31-Jan-12
 2012 NC FFA Farm Business Management Career Development Event

OPERATING INPUTS	UNITS	PRICE	QUANTITY	VALUE
Bulbs	Per Acre	300.000	1	300.00
Fumigation	Gallons	11.950	10.5	125.48
Organic Fertilizer (8-8-24)	Tons	800.000	1	800.00
Organic Sodium Nitrate (16-0-0)	Cwt	18.200	1.76	32.03
Organic Lime	Tons	27.000	9	243.00
Organic Herbicide & Fungicide	Per Acre	150.000	3	450.00
Organic Insecticides	Per Acre	47.160	1	47.16
Weed and Pest Management	Hours	60.510	15	907.65
Compost	Per Acre	151.000	1	151.00
Fuel, Lube and Repairs	Per Acre	450.000	1	450.00
Electricity	Kilowatt Hour	90.000	0.780	70.20
Crop Insurance	Dollars	75.000	1.000	75.00
Building Insurance	Dollars	83.200	1.000	83.20
Selling Charges	Dollars	1.000	1,200.000	1,200.00
Harvest Costs	Dollars	1.000	8,375.000	8,375.00
Baling Supplies	Dollars	8.000	1.000	8.00
Tractor/Machinery	Per Acre	66.210	1.000	66.21
Labor	Hours	9.500	75.000	712.50
Interest on Operating Capital	Dollars	6.00%	641.010	38.46
TOTAL OPERATING COSTS				14,134.89
FIXED COSTS		AMOUNT	VALUE	
Machinery/Tractor				
Interest at 7.150%		1.00	105.91	
Depr, Taxes, Insurance				
Barns				
Interest at 7.150%		1.00	132.58	
Depr, Taxes, Insurance		0.00	0.00	
Equipment				
Interest at 7.150%		0.00	0.00	
Depr, Taxes, Insurance		0.00	0.00	
Land				
Interest at 7.150%		0.00	0.00	
Taxes		0.00	0.00	
TOTAL FIXED COSTS				238.49
PRODUCTION	UNITS	PRICE	QUANTITY	VALUE
Onions & Garlic	Per Pounds	1.60	9,500.00	15,200.00
Net Govt Payment	Per Acre	0.00	0.00	0.00
TOTAL RECEIPTS				15,200.00
TOTAL RECEIPTS				15,200.00
TOTAL OPERATING COSTS				14,134.89
RETURNS ABOVE TOTAL OPERATING COSTS				1,065.11
TOTAL FIXED COSTS				238.49
NET RETURNS ABOVE ALL SPECIFIED COSTS				826.62

2012 NC FFA JUNIOR Farm Business Management

Problem Solving Section

Part 1 – Analysis of Cash Flow

27 points

Because cash revenue from farm operations varies widely from month-to-month, Mrs. Brouwer wants to assess her cash situation by quarter. In this section, complete the information about the Brouwer Farm Business cash flow based on the information given below. **Round to the nearest dollar.** Each question is worth 3 points

Important note: The Brouwers must maintain a minimum cash balance of \$3,000.

Quarter	1 st	2 nd	3 rd	4 th
Projected Cash Inflows	75,600	220,400	530,300	237,800
Projected Cash Outflows	196,500	230,700	220,100	250,600
Family Living	12,000	12,000	12,000	12,000
Cash difference	(132,900)	(22,300)	298,200	(24,800)
Beginning cash balance	22,900	3,000	3,000	161,800
Cash position	(110,000)	(19,300)	301,200	137,000
Money Borrowed this Period	113,000	22,300	0	0
Payment on Loan	0	0	139,400	0
Ending cash balance	3,000	3,000	161,800	137,000

What is the **cash difference** in the 1st quarter? (132,900) or -132,900

What is the **cash position** in the 1st quarter? (19,300) or -19,300

Which quarter has the **largest cash inflow**? third

Which quarter has the **smallest cash inflow**? first

What is the **total inflow**? 1,064,100

How much do they need to borrow each quarter to maintain the listed ending balance?

1st Quarter 113,000

2nd Quarter 22,300

3rd Quarter 0

4th Quarter 0

Part 2 – Analysis of Balance Sheets

40 points

Questions 1 through 11 refer to Brouwer Farm Business **Table 1. Statements of Net Worth** on **page 4**. For multiple choice questions, circle the correct response. For all other questions, write your answer in the blank. **Round ratios to two decimals.** Each question is worth 4 points.

Common Ratios and Financial Indicators	Formula
Current Ratio	Current Assets ÷ Current Liabilities
Working Capital	Current Assets - Current Liabilities
Debt-to-Equity	Total Liabilities ÷ Net Worth
Debt-to-Asset	Total Liabilities ÷ Total Assets

1. What was Brouwer Farm Business' Current Ratio on **December 31, 2010**?

0.301 or 0.30 (37160 / 123575)

2. What was Brouwer Farm Business' Current Ratio on **December 31, 2011**?

0.575 or 0.58 (49570 / 86166)

3. How much working capital did the Brouwer Farm Business have on **December 31, 2011**?

-36,596 (49570 - 86166)

4. Which measure shows the size or magnitude of the ratio of total liabilities to total assets?

- a) Equity-to-asset ratio
- b) Net worth
- c) **Debt-to-asset ratio ****
- d) All of the above
- e) None of the above

5. Consider the change in **liquidity** on Brouwer Farm Business between December 31, 2010 and December 31, 2011. Based on the balance sheet information, was the farm business:

- a) More liquid on December 31, 2010
- b) **More liquid on December 31, 2011 ****
- c) Less liquid on December 31, 2011
- d) Both B and C
- e) None of the above

6. What was the Brouwer Farm Business **Debt-to-Equity Ratio** on **December 31, 2010**?

8.46 (459421 / 54300)

7. What percent of the Brouwer Farm Business **assets were financed by debt** on **December 31, 2010**?

89% or 89.4 (459421 / 513721 *100%)

8. Consider the change in solvency on Brouwer Farm Business between December 31, 2010 and December 31, 2011. Based on the balance sheet information, was the farm business:

- a) More solvent on December 31, 2010
- b) **More solvent on December 31, 2011 ****
- c) Less solvent on December 31, 2011
- d) Both A and C
- e) None of the above

9. What was Brouwer Farm Business **Equity-to-Asset Ratio** on **December 31, 2011**?

0.30 or 0.301 (160234 / 531456)

10. What percent of Brouwer Farm Business **assets were financed by equity** on **December 31, 2011**?

30% (160234 / 531456)*100%

Part 3 – Analysis of Income Statements

20 points

Questions 1 through 5 refer to Brouwer Farm Business **Table 1. Statements of Net Worth on page 4** and **Table 2. Income Statements on page 5**. Round your answers to two decimals. Each question is worth 4 points.

Common Ratios and Financial Indicators	Formula
Rate of Return on Assets (ROA)	$(\text{Net Farm Income} + \text{Interest Expense} - \text{Unpaid Labor}) \div [\text{Average Value of Assets}]$
Rate of Return on Equity (ROE)	$(\text{Net Farm Income} - \text{Unpaid Labor}) / [\text{Average Value of Equity}]$
Asset Turnover Ratio	$\text{Total Revenue} / [\text{Average Value of Assets}]$
Return to Management	$\text{Net Farm Income} - \text{Unpaid labor} - \text{opportunity cost of farm equity}$
Net Farm Income from Operations Ratio	$\text{Net Farm Income} / \text{Gross revenue}$

Important Notes:

- Opportunity Cost of Farm Equity is 6.5%
- Value of Unpaid Labor is \$35,000

1. What is the **rate of return on assets in 2011**?

_____ 6.58 _____ %

$$(\text{NFI} + \text{Interest} - \text{Unpaid Labor}) / [(\text{Average Value of Assets})] = (43314 + 26082 - 35000) / ((513721 + 531456)/2) * 100\% = 6.58\%$$

2. What is the **rate of return on equity in 2011**?

_____ 7.75 _____ %

$$(\text{NFI} - \text{Unpaid Labor}) / [(\text{Average Value of Equity})] = (43314 - 35000) / ((54300 + 160234)/2) * 100\% = 7.75\%$$

3. What is the **asset turnover ratio in 2011**?

_____ 1.26 OR 126% OR 1.27 OR 127% _____

$$(\text{Gross Revenue}) / [(\text{Average Value of Assets})] = (661498 / ((513721 + 531456)/2)) = 1.27$$

*NOTE: The 2011 exam incorrectly listed this as a percent. Either answer is fine; however, respondent needs to be cautious about including “%” sign if they are providing the number in terms of a percent.

4. What is the **return to management in 2011**?

\$ _____ 1341.65 or 1342 or 1341.64 _____

$$(\text{NFI} - \text{Unpaid labor} - \text{opportunity cost of farm equity}) = 43314 - 35000 - 0.065 * ((54300 + 160234)/2) = 1341.64$$

5. What is the **net farm income from operations ratio in 2011?**

0.065 or 6.5% or 6.55%

(NFI / Gross revenue) = 43314 / 661498

*NOTE: The 2011 exam incorrectly listed this as a percent. Either answer is fine; however, respondent needs to be cautious about including “%” sign if they are providing the number in terms of a percent.

Part 4 – Enterprise & Budget Management

46 points

This part of the exam contains **two sections**.

- A. Properly identifying variable and fixed costs is important in planning and developing enterprise budgets. For the following costs, identify whether each item is a variable cost or a fixed cost. **Write a “V” in the blank if the item is a variable cost. Write an “F” in the blank if the item is a fixed cost. (2 points for each blank)**

- F Depreciation on machinery
- V Hourly labor
- F Insurance for machinery and equipment
- F Salary labor
- V Custom harvesting expenses
- V Feed purchases
- F Real estate taxes
- F or V Interest on annual operating capital
- V Fertilizer purchases

Interest of annual operating capital is a variable expense at the beginning of a production cycle. However, the variability of this expense (and all expenses, for that matter) decreases as the product moves closer to completion. A better way of wording this question would be to inform the participant of the stage of the production cycle.

For instance, which costs are fixed just before harvest? Answer: All costs except the labor materials needed for harvesting. The crops are in the ground. The producer is still on the hook for all costs up to that point of production, regardless of how much she chooses to harvest.

Which costs are fixed at the beginning of farm planning? Nearly all of them (perhaps except for land, unless the land hasn't yet been purchased or rented).

Participants should think about fixed and variable costs in the context of the stage of production. It'll make conceptualizing enterprise and partial budgets much more straight forward.

B. **Review Table 3. enterprise budget on page 6.** Answer the following questions related to Mrs. Brouwer's projections. **(4 points each correct response)**

1. What is the expected yield per acre?

9,500 pounds

2. What is the expected price for onions and garlic?

\$ 1.60 per pound

3. What are the expected costs per acre for compost?

\$ 151 per acre

4. What quantity of organic sodium nitrate will be applied per acre?

1.76 cwt.

5. What are the total receipts per acre?

\$ 15,200 per acre

6. If the price remains at \$1.60 per head and all costs remain unchanged, what is the break-even yield per acre to cover total operating costs? **Round answer to nearest whole number.**

8835 pounds
 $14134.89 / 1.60 = 8834.3 \rightarrow 8835$

7. What is the hired labor rate per hour?

\$ 9.5 per hour

Part 5 – Income Tax Management

30 points

Answer the following questions about the Brouwer Farm Business. Unless otherwise noted, use the **straight-line** method of depreciation.

1. In 2010, Mrs. Brouwer bought a tractor for \$95,000. For her 2010 taxes, she claimed the full value of the tractor as a Section 179 deduction. For the purposes of her 2011 taxes, what is the adjusted basis of the tractor?

\$ 0 (5)

2. Mrs. Brouwer bought a used bobcat for \$17,000. In addition she paid \$750 in sales taxes and a \$550 dealer delivery charge. To finance the purchase she borrowed \$10,000 from her bank, and received a \$5,000 credit for her old trade-in. The balance she paid in cash. What is her basis?

\$ 18300 (5)

3. For each of the items listed, place a **L** if it would be used in **low income year** and an **H** if it would be recommended for use in a **high income year** to make the best use of good tax planning for those years. (1 point each)

Item	Your Answer
Collect money due from custom work done	L
Get every expense recorded which you are entitled	H
Increase charitable contributions	H
Borrow money at bank to pay outstanding accounts	H
Use straight line depreciation	L
Delay sales of livestock or crops	H
Buy feed and other supplies for future use	H
Sell capital items which are no longer useful	L
Take option of reporting sealed grain as income	L
Pay wages to family members	H
Buy needed equipment for increased depreciation	H
Depreciate major repairs on buildings	H
Use Section 179 expensing rule	H
Postpone payments on open accounts till next year	L

4. Mr. Brouwer works for a local coffee roaster. He receives a salary and benefits, including medical insurance and free coffee. The income from his off-farm job is subject to which of the following taxes? (6 points. **Must have all three correct answers to earn points**)
- a. Self-employment tax
 - b. Employee's portion of OASDI and Medicare ****
 - c. NC State income tax ****
 - d. Federal income tax ****
 - e. Capital gains tax
 - f. Corporate income tax

Part 6 - Capital Investment Analysis

33 points

The Brouwer Farm Business currently owns and operates a tractor on **120 acres** of farmland. The tractor no longer works and Mrs. Brouwer is deciding between purchasing a new tractor, leasing a tractor from the local machinery dealer and operating it with in-house labor, and hiring the work she needs on a custom basis.

Depreciation Method	To calculate <u>yearly expense</u> :
Straight-line	(Full Purchase Price – Salvage Value) / (Useful life)
150% Declining Balance	(1.5 / useful life) * Adjusted Basis ^a

^a Note: Adjusted Basis = (Full Purchase Price – Cumulative Depreciation). For calculating depreciation in the first year, the Adjusted Basis = Full Purchase Price, since no depreciation has been taken.

Key Assumptions (**Hint: Pay attention to the units.**):

- Mrs. Brouwer assumes the work she needs takes **1.3 hours per acre**, regardless of whether the work is performed in-house or she contracts it out to someone else.
- Mrs. Brouwer's operating cost for doing the work herself is **\$15 per acre** including labor.
- The full purchase price for a new tractor is **\$65,000**, including all necessary implements. The useful life of the tractor is **7 years** and has a salvage value of **\$2,000**.
- The cost for **leasing** a tractor and all necessary implements averages **\$25 per hour**. This is in addition to the operating cost per acre mentioned previously.
- Hiring the work done on a custom basis would cost **\$25 per hour**.

A. Cost of Owning and Operating the Machinery:

First, calculate the yearly depreciation expense, assuming Mrs. Brouwer uses the **straight-line** method of depreciation. **Show your work. Round to two decimals.**

$$\text{\$ } \underline{\quad 9000 \quad} \quad (4) \quad [(\$65,000 - \$2,000) / 7]$$

Based on your answer above, what is the additional annual fixed cost per acre for owning the tractor? **Show your work. Round to two decimals.**

$$\text{\$ } \underline{\quad 75 \quad} \quad (4) \quad [(\$65,000 - \$2,000) / 7] / 120 = \$75$$

Based on your answer above, what is the **total cost per acre** for owning and operating the tractor? **Show your work. Round to two decimals.**

$$\text{\$ } \underline{\quad 90 \quad} \quad (4) \quad [(\$65,000 - \$2,000) / 7] / 120 + \$15 \text{ per acre} = \$90$$

If Mrs. Brouwer decided to base her decision using **150% declining balance method of depreciation**, what is the **total cost per acre** for owning and operating the tractor in the first year? **Show your work.**

$$\text{\$ } \underline{\quad 131.07 \quad} \quad (4) \quad (1.5 / 7 * \$65,000) / 120 + \$15 \text{ per acre} = \$131.07$$

B. Cost of Hiring Work on a Custom Basis:

What is the additional fixed cost per acre for custom hiring tractor-related work?

\$ 0 (4) There are no additional fixed costs associated with custom hiring tractor related work.

What is the **total cost per acre** for hiring tractor-related work on a custom basis? **Show your work.**

\$ 32.50 (3) [$\$25 * 1.3$]

C. Cost of Leasing and Operating the Machinery:

First, calculate the yearly leasing expense. **Show your work.**

\$ 3900 (4) $120 \text{ acres} * 1.3 \text{ hours per acre} * (\$25)$

What is the **total cost per acre** for leasing and operating the tractor? **Show your work.**

\$ 47.50 (4) $[1.3 \text{ hours per acre} * (\$25)] + \$15$

D. Investment Analysis:

Which one of the four alternatives has the **lowest cost per acre**?
[check one] (2 points)

Own and operate the tractor (using straight-line depreciation)

Own and operate the tractor (using 150% declining balance depreciation)

Hire the work done on a custom basis

Lease the tractor

End of the 2012 NC FFA Farm Business Management Exam

Score Sheet

Name: _____

Chapter: _____

2012 NC FFA			
JUNIOR Farm Business Management: Problem Solving			
		Possible Points	Contestant's Points
Part 1	Analysis of Cash Flow	27	
Part 2	Analysis of Balance Sheets	40	
Part 3	Analysis of Income Statements	20	
Part 4	Enterprise & Budget Management	46	
Part 6	Income Tax Management	30	
Part 7	Capital Investment Analysis	33	
		200	