

1) (20 pts. total, 2 pts. each) True or False? Mark your answer.

- a) T \_\_\_ F \_\_\_ Farmers buy crop insurance from crop insurance companies and sign up for commodity support programs at the USDA Farm Service Agency.
- b) T \_\_\_ F \_\_\_ Most Wisconsin corn and soybean growers insure their crops using Area Revenue Protection of Yield (ARPY) with a 90% or 95% coverage level.
- c) T \_\_\_ F \_\_\_ In the US, though accrual accounting is the business standard, most farms use cash accounting.
- d) T \_\_\_ F \_\_\_ USDA data shows that most (> 80%) Wisconsin farms are fairly large (>800 acres) with more than \$800,000 in annual sales.
- e) T \_\_\_ F \_\_\_ Crop insurance premiums are subsidized so that farmers pay less than the actuarially fair premium.
- f) T \_\_\_ F \_\_\_ One reason farmers use too much of some inputs (put some more on) is that underuse is obvious, overuse is invisible and the inputs are low cost.
- g) T \_\_\_ F \_\_\_ Dairy Margin Coverage (DMC) is a commodity support program for dairy farmers run by the USDA-FSA.
- h) T \_\_\_ F \_\_\_ The Market Facilitation Program (MFP) is a temporary program to pay farmers in 2018 and 2019 for losses due to tariffs from the trade wars.
- i) T \_\_\_ F \_\_\_ As Dr. Brian Luck discussed, most farmers will likely use crop consultants or other specialists to manage their data and make management decisions.
- j) T \_\_\_ F \_\_\_ Agricultural supply and food demand are relatively inelastic – prices vary widely, but farmers and food consumers make small quantity changes.

2a) (6 pts.) What is required for a farmer to be eligible to enroll for the potential to receive corn Price Loss Coverage (PLC) or County Agriculture Risk Coverage (County ARC) payments?

Suppose a farmer is eligible—what triggers a corn PLC Payment?

Suppose a farmer is eligible—what triggers a corn County ARC Payment?

**2b) (6 pts.)** You operate a farm that has 50 corn base acres enrolled in County ARC. The county guarantee is \$600/ac for 2019. The USDA announces that the 2019 county average yield is 180 bu/ac and the USDA national marketing year average price is \$3.40. Your actual corn yield for the farm was 200 bu/ac and you sold the corn for \$3.60/bu. What is your 2019 County ARC payment for the farm? (Remember you only receive 85% of the full payment).

What is your 2019 County ARC payment if instead you sell your 2019 corn crop for \$3.20?

What is your 2019 County ARC payment if you receive an insurance indemnity of \$35 per acre?

What is your 2019 County ARC payment for corn if you only plant soybeans on the farm?

**2c) (4 pts.)** You plant 35 acres of soybeans on a farm with 40 soybean base acres enrolled in PLC with a 40 bu/ac payment yield. The 2019 USDA national marketing year average price is \$8.30. You harvest 35 bu/ac and sell it at \$8.20/bu. The PLC Reference price is \$8.40/bu. What is your 2019 PLC payment for the farm? (Remember you only receive 85% of the full payment).

What is your 2019 PLC payment if you feed all of your 2019 soybean crop to your livestock?

**3) (16 pts. total)** Your farm has 100 corn base acres with a payment yield of 150 bu/ac, or  $100 \times 150 = 15,000$  bu of corn. You planted 120 corn acres with 75% Yield Protection (YP) insurance and a guarantee of  $75\% \times 180 \text{ bu/ac} \times 120 \text{ ac} = 16,200$  bushels. Your harvested yield averaged  $200 \text{ bu/ac} \times 120 \text{ acres} = 24,000$  bushels. You bought 10,000 bushels of corn from a neighbor.

**3a) (5 pts.)** Suppose you want to get a Marketing Assistance Loan (MAL). Place an X by **ALL** of the following options that you can use as collateral for a MAL.

- A \_\_\_\_\_ The 10,000 bushels of corn you bought from your neighbor
- B \_\_\_\_\_ The 16,200 bushels of corn from your YP yield guarantee
- C \_\_\_\_\_ The 15,000 bushels of corn from your base acres
- D \_\_\_\_\_ The 24,000 bushels of corn you harvested from your farm
- E \_\_\_\_\_ None of these, you need to have Revenue Protection (RP) to get a MAL

**3b) (2 pts.)** You use 8,000 bushels of eligible corn as collateral for a Marketing Assistance Loan (MAL). Using a corn loan rate of \$2.20/bu, how large would your loan be?

**3c) (6 pts.)** For this MAL, place an X by ALL of the following cases in which you would also receive a Loan Deficiency Payment.

- A \_\_\_ Pay back the MAL when the National Marketing Year Average Price is less than the target price for counter-cyclical payments
- B \_\_\_ Pay back the MAL using corn from your corn base acres
- C \_\_\_ Pay back the MAL with a PLC (Price Loss Coverage) or county ARC (Agriculture Risk Coverage) payment
- D \_\_\_ Pay back the MAL with a Yield Protection (YP) or Revenue Protection (RP) crop insurance indemnity
- E \_\_\_ Pay back the MAL when the Chicago Mercantile Exchange's November average of the December corn futures price is less than the loan rate
- F \_\_\_ You would not receive a Loan Deficiency Payment under any of these conditions

**3d) (3 pts.)** What is the main benefit to farmers for using Marketing Assistance Loans, even if they do not expect to receive Loan Deficiency Payments?

**4) (10 pts. total)** You insure 400 acres of corn in one unit with an average yield of 175 bu/ac.

**4a) (4 pts.)** You buy 75% Yield Protection (YP) crop insurance. What is your per acre yield guarantee? What is the total yield guarantee for your 400 acre unit?

**4b) (4 pts.)** You harvest a yield of 150 bu/ac from the unit. How many bushels do you harvest from the unit? What would be your insurance indemnity with a price election of \$4.00/bu?

**4c) (2 pts.)** Again, you harvest a yield of 150 bu/ac from the 400 acre unit. What will be your indemnity with a price election of \$4.00/bu if you actually sell the corn for \$3.50/bu?

**5) (14 pts. total)** Suppose a farm has 90 acres of soybeans in one insured unit with an average yield of 40 bu/ac as established by crop insurance rules and the Base Price is \$9.00/bu.

**5a) (4 pts.)** Suppose the farm buys 80% Revenue Protection (RP) crop insurance. What is the initial per acre revenue guarantee? What is the initial revenue guarantee for the 90 acre unit?

For 5b and 5c, the price increases over the season so that the official Harvest Price is \$10.00/bu.

**5b) (2 pts.)** What is the final revenue guarantee for the 90 acre unit?

**5c) (2 pts.)** Suppose the farmer actually harvests 2,700 bushels of soybeans from the unit, what would be the insurance indemnity, if any?

For 5d to 5f, the price decreases over the season so that the official Harvest Price is \$8.00/bu.

**5d) (2 pts.)** What is the final revenue guarantee for the 90 acre unit?

**5e) (2 pts.)** Suppose the farmer actually harvests 2,700 bushels of soybeans from the unit, what would be the insurance indemnity, if any?

**5f) (2 pts.)** Suppose the farmer actually sold the harvested soybeans for \$9.00/bu in May. How much would the crop insurance indemnity change?

**6 (12 pts.)** Mark an X in each box to indicate which yield and price each program or policy uses to determine payments. Note, each column will have at least one X for Yield and Price.

	PLC: Price Loss Coverage	AYP: Area Yield Protection	RP: Revenue Protection
<b><u>Yield</u></b>			
Actual Farm Yield			
County Average Yield			
Payment Yield for Base Acres			
<b><u>Price</u></b>			
Actual Farm Price			
Chicago Mercantile Exchange Price			
National Marketing Year Average Price			

**7a) (2 pts.)** What triggers an indemnity for the Area Revenue Protection (ARP) crop insurance?

**7b) (4 pts.)** You insure 200 acres of corn with an Area Revenue Protection (ARP) crop insurance policy with a 90% coverage level. The base price is \$4.00/bu, so the initial county revenue guarantee is  $90\% \times 190 \text{ bu/ac} \times \$4.00/\text{bu} = \$684/\text{ac}$ . Actual county yield is 160 bu/ac and actual farm yield is 150 bu/ac. The official harvest price is \$3.90/bu, but you sell the corn for \$3.50/bu. What would be the total insurance indemnity for all 200 acres?

**7c) (4 pts.)** Mark an X the box indicating how each event directly affects the ARP indemnity.

Event	Increase It	Decrease It	No Change
You don't sell your corn, but feed it to livestock			
Flooding causes county yield to fall to 100 bu/ac			
Due to hail, your farm yield falls to 100 bu/ac			
Tariffs cause the harvest price to fall to \$3.40			

**8) (4 pts. total)** Answer the following questions about business entities discussed in class (sole proprietor, partnership, C- and S-corporations, limited liability company) and financial liability.

**8a) (2 pts.)** Which business entities must register with the state's Department of Financial Institutions to be a legal business entity?

**8b) (2 pts.)** The owners of which of these business entities do not have their personal assets directly liable to pay the financial liabilities of the business?

**9) (8 pts. total)** Provide short answers to these questions. Jonathan and Taylor own a farm, with all assets owned as marital property with a right of survivorship under Wisconsin's marital property law. Among their assets is land worth \$400,000 with a tax basis of \$100,000 and corn worth \$80,000 with a \$0 tax basis (they raised it). Answer each question below.

**9a) (2 pts.)** If Jonathan and Taylor gave the land and corn to their son. How much gain would be triggered that Jonathan and Taylor must report for tax purposes?

Land Gain = \_\_\_\_\_

Corn Gain = \_\_\_\_\_

**9b) (2 pts.)** What is their son's tax basis in the land and in the corn?

Land Basis = \_\_\_\_\_

Corn Basis = \_\_\_\_\_

**9c) (2 pts.)** If their son then sold the land for \$400,000 and corn for \$80,000, how much gain must he report for tax purposes?

Land Gain = \_\_\_\_\_

Corn Gain = \_\_\_\_\_

**9d) (2 pts.)** Considering ordinary income tax, self-employment tax, and capital gain tax, which one or ones of these taxes would their son owe on this gain from the land sale? Which one or ones of these taxes would their son owe on this gain from the corn sale?

Taxes types owed on Land sale = \_\_\_\_\_

Taxes types owed on Corn sale = \_\_\_\_\_

**10) (9 pts.)** On your farm you grow soybeans, with an average yield of 60 bu/acre and an expected soybean price of \$9/bu. You are considering whether to use a seed treatment for early season insects and diseases. Talking to the sales person, you estimate that it will increase your yield by 2%, but it costs \$16 per acre. Also, because you get better stand establishment, you can plant fewer seeds per acre, reducing your seed costs per \$8 per acre.

**a) (7 pts.)** Use the given information to conduct a partial budget analysis of this switch to using a seed treatment by filling in the table below. Show your calculations in the space provided.

Benefits		Costs	
<u>Additional Revenues</u> What new revenue will be generated?		<u>Additional Costs</u> What new costs will be added?	
<u>Costs Reduced</u> What costs will be eliminated?		<u>Revenues Reduced</u> What revenues will be lost?	
Total Benefits (\$/ac)		Total Costs (\$/ac)	
Total Benefits – Total Costs = Net Benefit (\$/ac)			

**b) (2 pts.)** Based on your results, considering only the money earned, is buying the soybean seed treatment a profitable change? Briefly explain.

**11) (6 pts. total)** You are deciding on nitrogen for your corn crop. This table gives the nitrogen applied (pounds/ac) and the corn yield (bu/ac).

Nitrogen (pounds/ac)	Yield (bu/ac)	Marginal Product	Value of Marginal Product
80	190	--	--
90	194		
100	197		
110	198		

**11a) (2 pts.)** Use this table to show how to calculate the Marginal Product and then fill in the Marginal Product column in the table. Show your work for potential partial credit.

**11b) (2 pts.)** Corn sells for \$4.00/bu. Show how to calculate the Value of Marginal Product for one example, and then fill in the Value of Marginal Product column in the table.

**11c) (2 pts.)** If nitrogen costs \$0.40 per pound, what is the profit maximizing amount to apply based on the table above (you may need to interpolate between entries)?

**12) (10 pts)** Corn yield is  $Y = 150 + 5N - 0.02N^2$ , where Y is yield (bu/ac) and N is nitrogen fertilizer (pounds/ac). If the price of corn is \$4.00/bu and nitrogen costs \$0.40/pound, what is the profit maximizing amount of nitrogen to use? **Check the Second Order Condition.**



**13) (8 pts. total)** The table below reports the cost of producing duck eggs on your farm.

Eggs (dozens/year)	Fixed Cost	Variable Cost	Total Cost	Marginal Cost	Average Total Cost
14,500	10,000	33,000		--	
18,000	10,000	40,000			
21,000	10,000	49,000			
22,000	10,000	57,000			

**13a) (3 pts.)** Using the table above, show how to calculate Total Cost, Marginal Cost & Average Total Cost, then fill in the table's missing values. Show your work for potential partial credit.

**13b) (2 pts.)** Based on the information in the table, what is the profit maximizing number of duck eggs (dozens) to produce each year if a dozen sell for \$3.00 each?

**13c) (3 pts.)** Based on your Average Total Cost numbers in the table, if the farm produces and sells this many dozen per year, will it earn a positive economic profit? How do you know?

**14) (14 pts. total)** In 2017 you bought a used tractor for **\$160,000**.

**14a) (2 pts.)** For your internal farm accounting you plan to keep the tractor for 4 years. Calculate annual depreciation for the tractor assuming a **\$60,000 salvage value**. Fill in the table using **Straight Line Depreciation**. Show your work for potential partial credit.

Year	Depreciation During Year	Value at Year End
2017		
2018		
2019		
2020		

**14b) (2 pts.)** You have been depreciating the tractor you bought for \$160,000 for tax purposes using the IRS tax table below. Enter depreciation claimed in 2017 and 2018 in the table below.

Year	Tax Year	Depreciation Rate	Depreciation Claimed
1	2017	25.00%	
2	2018	21.43%	
3	2019	15.31%	
4	2020	10.93%	
5	2021	8.75%	
6	2022	8.74%	
7	2023	8.75%	
8	2024	1.09%	

**14c) (2 pts.)** What was your income tax basis in the tractor at the beginning of 2019?

**14d) (2 pts.)** If you decided to sell the tractor at the beginning of 2019 for \$100,000, how much gain or loss would you report on your income tax return?

**For parts e through g below, rather than using the table in part b, suppose instead you chose the Section 179 election and deducted the full cost of the tractor for your 2017 taxes.**

**14e) (2 pts.)** What is your income tax basis in the tractor at the beginning of 2019?

**14f) (2 pts.)** If you sold the tractor at the beginning of 2019 for \$100,000, how much gain or loss would you report on your income tax return? Which of the following taxes would be owed for this gain: ordinary income, self-employment, and/or capital gains?

**14g) (2 pts.)** Briefly explain the tax benefit that farmers gain by choosing the Section 179 election for depreciating purchased machinery like this tractor.

**15) (12 pts. total)** Use the simplified Balance Sheet and Income Statement below to answer these questions. Show your work for potential partial credit.

<b>BALANCE SHEET</b>				<b>1/1/2019</b>	<b>1/1/2018</b>
Current Assets	500,000	450,000	Current Liabilities	400,000	400,000
Non-Current Assets	2,000,000	1,800,000	Non-Current Liabilities	600,000	500,000
			Total Liabilities	1,000,000	900,000
			Equity	1,500,000	1,350,000
Total Assets	2,500,000	2,250,000	Total Liabilities and Equity	2,500,000	2,250,000

**15a) (2 pts.)** What is the Current Ratio on 1/1/2019?

**15b) (2 pts.)** What is the Debt to Asset Ratio on 1/1/2019?

**INCOME STATEMENT 1/1/2018 to 12/31/2018**

Crop and Livestock Sales	1,000,000
Operating Expenses	700,000
Interest Expenses	50,000
Net Farm Income from Operations	250,000

Assume the farm family paid themselves \$100,000 for their labor & management.

**15c) (2 pts.)** What is this farm's Return on Assets?

**15d) (2 pts.)** What is this farm's Rate of Return on Assets?

**15e) (2 pts.)** What is this farm's Return on Equity?

**15f) (2 pts.)** What is this farm's Rate of Return on Equity?