

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

- a) T___ F___ Wisconsin's cranberry industry maybe important in the U.S., but production in Canada far exceeds U.S. production.
- b) T___ F___ Data show that most households managing small farms (<\$250,000 in gross revenue) have done well in recent years, earning high farm income.
- c) T___ F___ With the new Farm Bill, most of the federal subsidies to farmers now come as commodity support payments (PLC & ARC), not crop insurance.
- d) T___ F___ Most Wisconsin corn and soybean growers insure their crops using Yield Protection (YP) with a 65%-75% coverage level.
- e) T___ F___ After correcting for inflation real crop prices for corn, soybean and wheat were much higher in the 1970s than recent high prices.
- f) T___ F___ Average crop yields and dairy cow productivity have not increased much in recent decades, majorly contributing to recent high prices.
- g) T___ F___ Based on lecturers in class, many farmers can expect more paperwork and record keeping to address sustainability requirements.
- h) T___ F___ The Dairy Margin Protection Program is a new crop insurance program protecting farmers from declines in their marginal product of feed.
- i) T___ F___ Life Cycle Assessments estimate the amount of inputs such as energy and water needed to produce, use and dispose of a specific consumer good.
- j) T___ F___ To buy SCO (Supplemental Coverage Option) insurance, you must buy traditional crop insurance for the crop and enroll in Price Loss Coverage.

2) (17 pts. total) For the questions below, assume you are a farmer.

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 Agricultural 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) (5 pts.) If you are a farmer, where do you go to sign up/enroll or buy each of the following?

Action	USDA Farm Service Agency	Crop Insurance Agent
Agriculture Risk Coverage (ARC)		
Area Revenue Protection (ARP)		
Revenue Protection (RP)		
Supplemental Coverage Option (SCO)		
Price Loss Coverage (PLC)		

Mark the boxes to indicate your answers to the following questions.

2c) (3 pts.) Suppose you have 20 corn base acres enrolled in County ARC. For each action below, would you Keep or Lose your eligibility for a corn County ARC Payment?

Action	Keep	Lose
Plant all 20 acres in soybeans (a program crop)		
Plant all 20 acres in alfalfa (a non-program crop)		
Convert the whole 20 acres to rural housing		

2d) (3 pts.) Suppose you have 20 base acres enrolled in PLC. For each action below, would you Keep or Lose your eligibility for a corn PLC Payment? (The corn Reference Price is \$3.70/bu).

Action	Keep	Lose
Plant all 20 acres in corn and sell it for \$4.00/bu		
Plant all 20 acres in corn and sell it for \$3.00/bu		
Plant all 20 acres in potatoes to sell to Kettle Chips		

3) (12 pts. total) Answer the questions below, assuming you grew 50,000 bushels of corn and bought another 30,000 bushels, all to feed to your dairy cows.

3a) (3 pts.) Suppose you want to get a Marketing Assistance Loan (MAL), which of the following options are you eligible for? (Mark **ALL** options that are possible)

- A__ Get a MAL using all 80,000 bu as collateral
- B__ Get a MAL using only the 30,000 bu of purchased corn as collateral
- C__ Get a MAL using only the 50,000 bu of corn you grew as collateral
- D__ Get a MAL using 40,000 bu of the 50,000 bu you grew as collateral
- E__ None of these options, you are not eligible for a MAL
- F__ All of these options are possible for a MAL

3b) (3 pts.) If you are eligible and the corn loan rate is \$1.95, what is the maximum Marketing Assistance Loan could you get?

3c) (3 pts.) If you took out the maximum Marketing Assistance Loan for your corn, for which of the following cases would you receive a Loan Deficiency Payment? (Mark **ALL** that are correct)

- A__ Pay back the MAL when the posted county price is less than the \$1.95 loan rate
- B__ Pay back the MAL when the posted county price is greater than the \$1.95 loan rate
- C__ Pay back the MAL on May 1 when the posted county price is \$1.80, but sell the corn on June 1 for \$2.00/bu
- D__ Pay back the MAL on May 1 when the posted county price is \$2.00, but sell the corn on June 1 for \$1.80/bu
- E__ You would receive a Loan Deficiency Payment under all of these conditions
- F__ You would receive a Loan Deficiency Payment under none of these conditions

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

4) (10 pts. total) Suppose a farm has an 90 ac field of corn in one insured unit with an average yield of 170 bu/ac as established by crop insurance rules.

4a) (4 pts.) Suppose the farmer buys 70% Yield Protection (YP) crop insurance. What is the per acre yield guarantee? What is the total yield guarantee for the 90 ac unit?

4b) (4 pts.) Suppose the farmer's actual harvested yield is 110 bu/ac on the unit. How many bushels in total does the farmer harvest from the unit. What is the insurance indemnity, if any, assuming a 100% price election of \$4.00/bu?

4c) (2 pts.) Suppose the farmer actually sells the harvested corn for \$3.50/bu. How much does the crop insurance indemnity change?

5) (12 pts. total) Suppose a farm has a 100 ac field of soybeans in one insured unit with an average yield of 40 bu/ac as established by crop insurance rules and a \$10.00/bu Base Price.

5a) (4 pts.) Suppose the farm buys 75% Revenue Protection (RP) crop insurance. What is the initial per acre revenue guarantee? What is the initial revenue guarantee for the 100 acre unit?

For 5b and 5c, the price decreases over the season so that the official harvest price is \$9.00/bu.

5b) (2 pts.) What is the final revenue guarantee for the 100 acre unit?

5c) (2 pts.) Suppose the farmer actually harvests 3,000 bushels of soybeans from the unit, what would be the insurance indemnity?

For 5d and 5e, the price increases over the season so that the official harvest price is \$11.00/bu.

5d) (2 pts.) What is the final revenue guarantee for the 100 acre unit?

5e) (2 pts.) Suppose the farmer actually harvests 3,000 bushels of soybeans from the unit, what would be the insurance indemnity?

6 (10 pts. total) Answer the following questions about crop insurance.

The federal government subsidizes crop insurance, paying about two-thirds of the “actuarially fair” premium for most farmers, so that, from a farmer’s perspective, the loss ratio is about 3.0 while the program loss ratio is around 1.0.

6a) (4 pts.) What is the actuarially fair premium? For context, what is the actuarially fair premium for a policy that pays \$100/ac once every 4 years and \$0/ac the other 3 years?

6b) (4 pts.) Explain what a farmer loss ratio of 3.0 means in terms of expected average returns from buying crop insurance. For context, what does a farmer loss ratio of 3.0 mean in terms of an average indemnity for a policy that costs \$10 per acre?

6c) (2 pts.) In class, we saw maps of corn and soybean loss ratios by county across the Midwest. Which counties tended to have high loss ratios: counties with high average yields like Dane County or those with low average yields like Ashland County?

7a) (2 pts.) What triggers an indemnity for the Area Yield Protection (AYP) crop insurance?

7b) (4 pts.) You insure 200 acres of corn under an Area Revenue Protection (ARP) crop insurance policy in Smith County with a 90% coverage level. The county revenue guarantee is $90\% \times 160 \text{ bu/ac} \times \$4.00/\text{bu} = \$576/\text{ac}$. If actual county yield is 135 bu/ac and the harvest price is \$4.10, what would be the total insurance indemnity for your corn acres?

7c) (4 pts.) How does each event below affect the corn ARP indemnity?

Event	Not at All	Lose Indemnity
Harvest 170 bu/ac from your corn acres		
You are hit by hail and lose 75% of your yield		
Sell your harvested corn for \$3.50/bu		
Sell your harvested corn for \$4.50/bu		

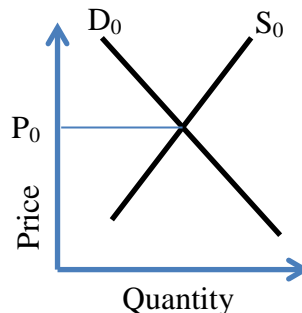
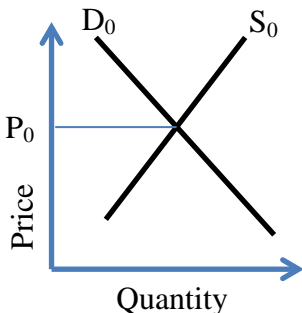
8a) (3 pts.) Sustainability is commonly referred to as having three main elements or aspects. As discussed in class, which of the following name those three elements (Mark all that are correct).

- A__ Social, Economic, and Environmental
- B__ Energy, Equity and Environment
- C__ People, Profit and Planet
- D__ Personnel, Practices, and Profits
- E__ Society, Science, and Satisfaction

8b) (3 pts.) Which of the following statements are consistent with Cochrane's Treadmill as discussed in class (Mark all that are correct).

- A__ New technologies increase supply and drive down prices, so smaller farms are more efficient and survive since they have lower overhead.
- B__ Early technology adopters capture the economic benefits of new technologies before prices fall due to higher supplies.
- C__ Farmers have to keep adopting new technologies as the old ones become obsolete in order to take advantage of higher prices.
- D__ Farm size will tend to increase as more and more smaller farms become unable to keep up with the technology treadmill and falling real prices.
- E__ Data presented in class showed that average U.S. farm size has continued to increase over the last 20-30 years

8c) (3 pts.) Both supply and demand have been increasing. Population and income growth increase demand which increases crop prices while technology change increases supply and reduces crop prices. The plots below show current supply S_0 and demand D_0 for a grain crop, generating the price P_0 . Draw and label a new supply S_1 and new demand D_1 and the new price P_1 . For the left plot, draw the new supply and demand curves to imply a new higher grain price and for the right plot, draw the new supply and demand curves to imply a new lower grain price. Finally, indicate which of the two plots is the outcome predicted by Cochrane's Treadmill.



9) (4 pts. total) Answer the following questions about business entities and liability.

9a) (2 pts.) Which business entities discussed in class (sole proprietor, partnership, C and S-corporations, limited liability company) provide some limited liability to the owners?

9b) (2 pts.) When we say these entities have “limited liability” what is meant – liability for what is limited? Be brief.

10) (16 pts. total) Provide short answers to each of the following questions. Jon and Amy own a farm, with all assets owned as marital property with a right of survivorship under Wisconsin’s marital property law. They have a daughter Ann. Among their assets is land worth \$600,000 with a tax basis of \$100,000 and \$200,000 of corn grain with a \$0 tax basis (they raised it). Answer each question below. Give a brief explanation for each answer.

10a) (2 pts.) If Jon and Amy gave the land and grain to Ann, what is Ann’s income tax basis in the land and in the corn?

10b) (2 pts.) If Ann then sells the land for \$600,000 and the corn for \$200,000, how much gain must he report?

10c) (2 pts.) Considering ordinary income tax, capital gain tax, and self-employment tax, which one or ones of these taxes would Ann owe on this gain from the land sale? Which one or ones of these taxes would Ann owe on this gain from the grain sale?

10d) (2 pts.) If Jon died and then Amy gave the land to Ann, how much gain would Ann have to report if she sold the land soon thereafter for \$600,000 and the grain for \$200,000?

10e) (1 pts.) If Jon did not die, but instead Jon and Amy contributed the land to a Limited Liability Company (LLC) that the two of them completely owned and the next day their LLC sold the land for \$600,000, how much gain would the LLC realize?

10f) (1 pts.) Assume the LLC realizes gain from the sale, does it pay income tax on the gain? Do Jon and Amy (sole owners of the LLC) pay income tax on the gain?

10g) (1 pts.) Instead of selling the land, the LLC returns it back to Jon and Amy. Does the LLC and/or Jon and Amy have to pay income tax as a result of this transfer?

10h) (1 pts.) Instead Jon and Amy contributed the land to a C-Corporation that the two of them completely owned and the next day their Corporation sold the land for \$600,000, how much gain would the Corporation realize?

10i) (2 pts.) Assume the Corporation realizes gain from the sale, does it pay income tax on the gain? Do Jon and Amy (sole owners of the Corporation) pay income tax on the gain?

10j) (2 pts.) Instead of selling the land, the Corporation returns it back to Jon and Amy. Does the Corporation and/or Jon and Amy have to pay income tax as a result of this transfer?

11) (6 pts. total) You are deciding the potassium fertilizer for your soybean crop. This table gives the potassium fertilizer applied in pounds per acre and the soybean yield (bu/ac).

Potassium (lbs/ac)	Yield (bu/ac)	Marginal Product	Value of Marginal Product
30	45.00	--	--
40	46.00		
50	46.50		
60	46.75		

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.) Soybeans sell for \$10.00/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 potassium fertilizer costs \$0.50 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) Soybean yield is $Y = 30 + 0.9X - 0.01X^2$, where Y is yield (bu/ac) and X is nitrogen fertilizer (lbs/ac). If the price of soybeans is \$10.00/bu and nitrogen fertilizer costs \$0.50/lb, what is the profit maximizing amount of nitrogen fertilizer to apply? **Don't Forget to Check the Second Order Condition.**

13) (8 pts. total) This table reports the costs (\$/week) to produce organic eggs (dozens/week).

Dozens of Eggs	Fixed Cost	Variable Cost	Total Cost	Marginal Cost	Average Total Cost
120	100	125		--	
130	100	135			
140	100	150			
150	100	175			

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 dozens of eggs to produce if organic eggs sell for \$2.00/dozen?

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

14) (14 pts. total) In 2012 you bought a tractor for \$100,000.

14a) (2 pts.) For your farm accounts you plan to keep the tractor for 4 years. Calculate annual depreciation for the tractor assuming a \$40,000 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
2012		
2013		
2014		
2015		

14b) (2 pts.) You have been depreciating the tractor you bought for \$100,000 for tax purposes using the IRS tax table below. Enter depreciation claimed in 2012 and 2013 in the table below.

Year	Tax Year	Depreciation Rate	Depreciation Claimed
1	2012	4.57%	
2	2013	26.58%	
3	2014	20.65%	
4	2015	14.06%	
5	2016	10.04%	
6	2017	8.73%	
7	2018	8.73%	
8	2019	6.64%	

14c) (2 pts.) What is your income tax basis in the tractor at the beginning of 2014?

14d) (2 pts.) If you sold the tractor at the beginning of 2014 for \$40,000, 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 a, suppose instead you chose the Section 179 election and deducted the full cost of the tractor for your 2012 taxes.

14e) (2 pts.) What is your income tax basis in the tractor at the beginning of 2014?

14f) (2 pts.) If you sold the tractor at the beginning of 2014 for \$40,000, 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.

BALANCE SHEET	12/31/2013	12/31/2012		12/31/2013	12/31/2012
Current Assets	250,000	200,000	Current Liabilities	180,000	130,000
Non-Current Assets	550,000	530,000	Non-Current Liabilities	280,000	250,000
			Total Liabilities	460,000	380,000
			Equity	340,000	350,000
Total Assets	800,000	730,000	Total Liabilities and Equity	800,000	730,000

15a) (2 pts.) What is the Current Ratio on 12/31/2013?

15b) (2 pts.) What is the Debt to Asset Ratio on 12/31/2013?

INCOME STATEMENT 12/31/2012 to 12/31/2013

Crop and Livestock Sales	290,000
Operating Expenses	160,000
Interest Expenses	30,000
Net Farm Income from Operations	100,000

Assume the farm family paid themselves \$50,000 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?