

(1.a) Fill in the missing cells below.

(1.b) If we don't produce any wheat our profits will be \$_____ per acre.

(1.c) If we produce wheat but don't apply any nitrogen our profits will be \$_____ per acre.

(1.d) The profit-maximizing level of nitrogen use is _____ lbs

N per acre, producing _____ bushels of wheat per acre and providing profits of \$_____ per acre.

Price of wheat		\$ / bushel
Price of nitrogen		\$ / lb
Fixed Costs		\$ / acre
Other Variable Costs		\$ / acre
Externality	IGNORE	\$ / lb N

Produce wheat?	Nitrogen (lbs / acre)	Wheat yield (bushels / acre)	Cost of nitrogen application (\$ / acre)	Total fixed costs (\$ / acre)	Total variable costs (\$ / acre)
NO	0.00	0.00	-----		-----
Yes	0.00	23.00	-----		
Yes	10.00	25.00			
Yes	20.00	30.50			
Yes	30.00	40.00			
Yes	40.00	55.00			
Yes	50.00	45.20			
Yes	60.00	45.15			

Produce wheat?	Nitrogen (lbs / acre)	Wheat yield (bushels / acre)	Total private costs (\$ / acre)	Revenues (\$ / acre)	Private profits (\$ / acre)
NO	0.00	0.00		-----	
Yes	0.00	23.00			
Yes	10.00	25.00			
Yes	20.00	30.50			
Yes	30.00	40.00			
Yes	40.00	55.00			
Yes	50.00	45.20			
Yes	60.00	45.15			

(2.a) Fill in the missing cells below.

(2.b) If we don't produce any wheat our profits will be \$ _____ per acre.

(2.c) If we produce wheat but don't apply any nitrogen our profits will be \$ _____ per acre.

(2.d) The profit-maximizing level of nitrogen use is _____ lbs

N per acre, producing _____ bushels of wheat per acre and providing profits of \$ _____ per acre.

Price of wheat		\$ / bushel
Price of nitrogen		\$ / lb
Fixed Costs		\$ / acre
Other Variable Costs		\$ / acre
Externality	IGNORE	\$ / lb N

Produce wheat?	Nitrogen (lbs / acre)	Wheat yield (bushels / acre)	Cost of nitrogen application (\$ / acre)	Total fixed costs (\$ / acre)	Total variable costs (\$ / acre)
NO	0.00	0.00	-----		-----
Yes	0.00	23.00	-----		
Yes	10.00	25.00			
Yes	20.00	30.50			
Yes	30.00	33.00			
Yes	40.00	35.00			
Yes	50.00	36.00			
Yes	60.00	36.20			

Produce wheat?	Nitrogen (lbs / acre)	Wheat yield (bushels / acre)	Total private costs (\$ / acre)	Revenues (\$ / acre)	Private profits (\$ / acre)
NO	0.00	0.00		-----	
Yes	0.00	23.00			
Yes	10.00	25.00			
Yes	20.00	30.50			
Yes	30.00	33.00			
Yes	40.00	35.00			
Yes	50.00	36.00			
Yes	60.00	36.20			

(3.a) Fill in the missing cells below.

(3.b) If we don't produce any wheat our profits will be \$_____ per acre.

(3.c) If we produce wheat but don't apply any nitrogen our profits will be \$_____ per acre.

(3.d) The profit-maximizing level of nitrogen use is _____ lbs

N per acre, producing _____ bushels of wheat per acre and providing profits of \$_____ per acre.

Price of wheat		\$ / bushel
Price of nitrogen		\$ / lb
Fixed Costs		\$ / acre
Other Variable Costs		\$ / acre
Externality	IGNORE	\$ / lb N

Produce wheat?	Nitrogen (lbs / acre)	Wheat yield (bushels / acre)	Cost of nitrogen application (\$ / acre)	Total fixed costs (\$ / acre)	Total variable costs (\$ / acre)
NO	0.00	0.00	-----		-----
Yes	0.00	23.00	-----		
Yes	10.00	25.00			
Yes	20.00	30.50			
Yes	30.00	40.00			
Yes	40.00	45.00			
Yes	50.00	47.00			
Yes	60.00	43.00			

Produce wheat?	Nitrogen (lbs / acre)	Wheat yield (bushels / acre)	Total private costs (\$ / acre)	Revenues (\$ / acre)	Private profits (\$ / acre)
NO	0.00	0.00		-----	
Yes	0.00	23.00			
Yes	10.00	25.00			
Yes	20.00	30.50			
Yes	30.00	40.00			
Yes	40.00	45.00			
Yes	50.00	47.00			
Yes	60.00	43.00			

(4.a) Fill in the missing cells below.

(4.b) If we don't produce any wheat our profits will be \$ _____ per acre.

(4.c) If we produce wheat but don't apply any nitrogen our profits will be \$ _____ per acre.

(4.d) The profit-maximizing level of nitrogen use is _____ lbs

N per acre, producing _____ bushels of wheat per acre and providing profits of \$ _____ per acre.

Price of wheat		\$ / bushel
Price of nitrogen		\$ / lb
Fixed Costs		\$ / acre
Other Variable Costs		\$ / acre
Externality	IGNORE	\$ / lb N

Produce wheat?	Nitrogen (lbs / acre)	Wheat yield (bushels / acre)	Cost of nitrogen application (\$ / acre)	Total fixed costs (\$ / acre)	Total variable costs (\$ / acre)
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Yes	0.00	23.00	-----		
Yes	10.00	25.00			
Yes	20.00	30.50			
Yes	30.00	33.00			
Yes	40.00	35.00			
Yes	50.00	36.00			
Yes	60.00	36.20			

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NO	0.00	0.00		-----	
Yes	0.00	23.00			
Yes	10.00	25.00			
Yes	20.00	30.50			
Yes	30.00	33.00			
Yes	40.00	35.00			
Yes	50.00	36.00			
Yes	60.00	36.20			

(5.a) Fill in the missing cells below.

(5.b) If we don't produce any wheat our profits will be \$ _____ per acre.

(5.c) If we produce wheat but don't apply any nitrogen our profits will be \$ _____ per acre.

(5.d) The profit-maximizing level of nitrogen use is _____ lbs

N per acre, producing _____ bushels of wheat per acre and providing profits of \$ _____ per acre.

Price of wheat		\$ / bushel
Price of nitrogen		\$ / lb
Fixed Costs		\$ / acre
Other Variable Costs		\$ / acre
Externality	IGNORE	\$ / lb N

Produce wheat?	Nitrogen (lbs / acre)	Wheat yield (bushels / acre)	Cost of nitrogen application (\$ / acre)	Total fixed costs (\$ / acre)	Total variable costs (\$ / acre)
NO	0.00	0.00	-----		-----
Yes	0.00	23.00	-----		
Yes	10.00	25.00			
Yes	20.00	30.50			
Yes	30.00	40.00			
Yes	40.00	45.00			
Yes	50.00	47.00			
Yes	60.00	43.00			

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NO	0.00	0.00		-----	
Yes	0.00	23.00			
Yes	10.00	25.00			
Yes	20.00	30.50			
Yes	30.00	40.00			
Yes	40.00	45.00			
Yes	50.00	47.00			
Yes	60.00	43.00			

(6.a) Fill in the missing cells below.

(6.b) If we don't produce any wheat our profits will be \$_____ per acre.

(6.c) If we produce wheat but don't apply any nitrogen our profits will be \$_____ per acre.

(6.d) The profit-maximizing level of nitrogen use is _____ lbs

N per acre, producing _____ bushels of wheat per acre and providing profits of \$_____ per acre.

Price factory receives for its product		\$ / unit produced
Hourly price / wage paid to workers		\$ / hour
Fixed Costs		\$ / acre
Other Variable Costs		\$ / acre
Externality	IGNORE	\$ / lb N

Total hours of labor	Factory Production	Labor Costs	Revenues	Profits
100	10000			
200	13000			
300	16000			
400	17000			
500	17500			
600	17600			
700	17650			
800	17000			
900	16800			
1000	16500			

- (7) To maximize profits, a farmer does not apply the amount of nitrogen that maximizes yield. Why?
- Because that amount of nitrogen use causes fixed costs to rise.
 - Because if we apply that much nitrogen, the last few lbs of nitrogen costs more than the additional revenues they provide.
 - Because that much nitrogen would harm the crops and lower yield.
 - Because that would result in so much wheat being produced that the price of wheat would fall.
 - b, d
- (8) A farmer who applies however much nitrogen is needed to maximize yield is making the mistake of...
- ...not thinking about the impact each lb of nitrogen has on yield.
 - ...not thinking about how higher yields reduce crop prices.
 - ...not thinking about the cost of nitrogen.
 - ...spending too little time thinking about how nitrogen use and fixed costs are correlated.
 - a, c
- (8) A farmer should increase the amount of nitrogen she applies per acre of wheat...
- ...whenever its marginal product is positive.
 - ...until the marginal product equals zero.
 - ...until the marginal product turns negative.
 - ...until it equals one.
 - None of these.
- (9) Like a farmer applying nitrogen, a factory should increase labor hours so long as...
- ...the factory is operating in stage 2 of production.
 - ...not thinking about how higher yields reduce crop prices.
 - ...the marginal product of labor is positive.
 - ...the value of the additional factory production is greater than the cost of the extra labor hours.
 - a, c