

Question 1 (35 marks)

Bloomington Brewery (SMA Chapter 3, Problem 34)

(a) The two decisions facing Bloomington Brewery are: } 4 marks; 2 for each decision;
How many barrels of Beer to make
How many barrels of Ale to make

b) See attached Model1 } 15 marks

c) Bloomington Brewery should make } 5 marks
10 barrels of Beer
5 barrels of Ale

(d) **Binding** constraints are **Corn and Hops** } 1 mark

Non binding are **non-negativity** } 0 marks

(e) See Model1 worksheet attached } 5 marks

(f) See Formulas1 worksheet attached } 5 marks

Question 1 (Bloomington Brewery)

Bloomington Brewery (SMA Chapter 3, Problem 34)

Input Data

	Each Barrel of		Pounds		Pounds	Units
	Beer	Ale	Used		Available	
Corn	5	2	60	<=	60	pounds
Hops	2	1	25	<=	25	pounds
			Total			
Selling Price	\$ 4.40	\$ 2.00	\$ 54.00			

Target Cell: \$ 54.00
 Constraints: Corn, Hops

Action Plan

	Beer	Ale
# Barrels	10	5

Changing Cells: # Barrels

Marking Guide:

- * This sheet is worth 15 marks (part b) for the Excel model (+ 5 marks (part e) for just printing the page in landscape - deduct 1 mark if it is printed in Portrait)
- * Deduct a maximum of 1 mark if students do not use some formatting (bold, shading, borders etc)
- * Do NOT deduct any marks if their model layout is well organized, easily understood by you the marker, and they show at least one formatting activity.
- * 1 mark should be allocated to the 3 textboxes (Total of 1 mark for all 3 textboxes)
- * 1 mark should be allocated to titles (Beer, Corn, Pounds Used etc)

	A	B	C	D	E	F	G	H
1	Question 1 (Bloomington Brewer)							
2	Bloomington Brewer							
3								
4	Input Data							
5		Each Barrel of			Pounds		Pounds	
6		Beer	Ale		Used		Available	Units
7	Corn	5	2		=SUMPRODUCT(C6:D6,\$C\$13:\$D\$13)	<=	60	pounds
8	Hops	2	1		=SUMPRODUCT(C7:D7,\$C\$13:\$D\$13)	<=	25	pounds
9				Total				
10	Selling Price	4.4	2		=SUMPRODUCT(C9:D9,\$C\$13:\$D\$13)			
11	Action Plan							
12		Beer	Ale					
13	# Barrels	10	5					
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
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32								

Marking Guide:

- * This printing of this formula page is worth **5 marks** in Total
- * deduct 2 marks if the formulas are cutoff: ie: SUMPRODUCT(C6:D6, \$C
- * Formulas other than sumproduct are OK; Do **not** deduct unless cutoff.
- * deduct 1 mark if sheet is not printed in Landscape
- * do **NOT** deduct if they show the Text boxes (Target Cell, Constraints, Changing Cells) carried over from Model1
- * deduct 1 mark if Row and Column Headings are NOT shown (because these are absolutely necessary in order to check and understand the formulas).
- * deduct 0 marks if they show/ gridlines (although this sheet looks better without gridlines).
- * deduct 0 marks if they omit \$ signs in formulas (although it would be better to have them)

Question 2 (40 marks)

Calhoun Farms

(a) The two decisions facing Calhoun are:

How many acres of Beans to plant
How many acres of Wheat to plant

}

4 marks; 2 for each decision;

b) See attached Model2 } 15 marks

c) Calhoun should plant
350.4 acres of Beans and
132.8 acres of Wheat } 5 marks

d) **196.8 acres** (680 - 483.2) } 2 marks

e) **Harvest and Planting times** } 2 marks

(f) **Binding** constraints are **Harvest and Planting time** } 1 mark

Non - binding are **Acres and MinDem** } 1 mark
(and non negativity)

(g) See Model2 worksheet attached } 5 marks

(h) See Formulas2 worksheet attached } 5 marks

Question 2
Calhoun Farms

Input Data

	Each Acre		Model Output		Model Requirement	
	Beans	Wheat				
Harvest	2	1.5	900	<=	900	hours
Plant	1	2	616	<=	616	hours
Acres	1	1	483.2	<=	680	acres

Note on Acres constraint:
This constraint is non-binding and, if you leave it out from the formulation, you will still get the same answer in the changing cells. However, while the "answer" is correct, the model is not, so a significant mark deduction is appropriate. See Below.

	Beans	Wheat	Total Revenue
Rev/acre	\$ 200.00	\$ 300.00	\$ 109,920.00

Constraints

Target Cell

Action Plan

	Beans	Wheat
# acres to plant	350.40	132.80

Changing Cells

Additional Constraints

	Model Output		Model Requirement
Min Dem for Beans	350.40	>=	80

Constraint

Note to Markers:
There are several other "correct alternate formulations" to this problem. One of these is shown on the Model2-alt spreadsheet

Marking Guide:
 * This sheet is worth 15 marks(part b) for the Excel model (+ 5 marks(part g) for just printing the page in landscape - deduct 1 mark if it is printed in Portrait
 * Deduct a maximum of 1 mark if students do not use some formatting (bold, shading, borders etc)
 * Do NOT deduct any marks if their model layout is well organized, easily understood by you the marker, and they show at least one formatting activity.
 * 1 mark should be allocated to the 3 textboxes (Total of 1 mark for all 3 textboxes)
 * 1 mark should be allocated to titles (Beans,Wheat Harvest etc)
 * Deduct 4 marks if the Acres constraint in Input Data (row 9) is missing
 * Deduct 2 marks if changing cells are formatted to 0 decimal places (350 and 133)

	A	B	C	D	E	F	G	H
1	Question 2							
2	Calhoun Farms							
3								
4	Input Data							
5		Each Acre			Model		Model	
6		Beans	Wheat		Output		Requirement	
7	Harvest	2	1.5		=SUMPRODUCT(C7:D7,\$C\$16:\$D\$16)	<=	900	hours
8	Plant	1	2		=SUMPRODUCT(C8:D8,\$C\$16:\$D\$16)	<=	616	hours
9	Acres	1	1		=SUMPRODUCT(C9:D9,\$C\$16:\$D\$16)	<=	680	acres
10								
11				Total Revenue				
12	Rev/acre	200	300		=SUMPRODUCT(C12:D12,\$C\$16:\$D\$16)			
13								
14	Action Plan							
15		Beans	Wheat					
16	# acres to plant	350.4	132.8					
17								
18	Additional Constr							
19					Model		Model	
20					Output		Requirement	
21	Min Dem for B				=C16	>=	80	
22								
23								
24								
25	Marking Guide:							
26	* This printing of this formula page is worth 5 marks in Total							
27	* deduct 2 marks if the formulas are cutoff: ie:							
28	SUMPRODUCT(C7:D7, \$C							
29	* Formulas other than sumproduct are OK; Do not deduct							
30	unless cutoff.							
31	* deduct 1 mark if sheet is not printed in Landscape							
32	* do NOT deduct if they show the Text boxes (Target Cell,							
33	Constraints, Changing Cells) carried over from Model1							
34	* deduct 1 mark if Row and Column Headings are NOT							
35	shown (because these are absolutely necessary in order to							
36	check and understand the formulas).							
37	* do NOT deduct if they include Gridlines (although this							
38	sheet looks better without gridlines).							
39	* deduct 0 marks if they omit \$ signs in formulas (although it							

Question 2

Calhoun Farms

Input Data

	Each Acre		Model Output		Model Requirement	
	Beans	Wheat				
Harvest	2	1.5	900	<=	900	hours
Plant	1	2	616	<=	616	hours
Acres	1	1	483.2	<=	680	acres
Min Dem Beans	1	0	350.4	>=	80	acres
			Total Revenue			
Rev/acre	\$ 200.00	\$ 300.00	\$ 109,920.00			

Note to markers:

This is a correct alternate formulation to Calhoun Farms. No deduction should occur if this (or any other) correct alternate formulation is submitted.

Action Plan

	Beans	Wheat
# acres to plant	350.40	132.80