Abdullah Dar 21-L-7512 BSCS-6G

Operational Research

Assignment no 1

Question no 1:

Maximize the profit for the given scenario.

Objective Equation: $Z = 2x_1 + 7x_2$

Constraints: -

$$-4x_1 + 12x_2 <= 7$$

$$12x_1 <= 18$$

$$-6x_1 + 5x_2 <= 6$$

$$2x_1 - 3x_2 <= 1$$

Solution:

X = 1.5

Y = 1.08333333

Z = 10.58333

Excel Screenshot:

	A	B	C	D	E	F
1	Variables	x1	x2			
2		1.5	1.08333333			
3						
4	Objective	x1	x2	z		
5	Maximize	2	7	10.583333		
6						
7	Constraints	x1	x2	Value	InEquality	Constant
8		-4	12	7	<=	7
9		12	0	18	<=	18
10		-6	5	-3.583333	<=	6
11		2	-3	-0.25	<=	1
12						

Question no 2:

Maximize the sales for the given scenario.

Objective Equation: $Z = 9x_1 + 3x_2$

Constraints: -

$$2x_1 + 5x_2 <= 17$$

$$8x_1 + 6x_2 <= 8$$

$$3x_1 - x_2 <= 2$$

$$5x_1 + 2x_2 <= 1$$

$$4x_1 + x_2 <= 4$$

$$7x_1 <= 14$$

Solution:

X = 0.2

Y = 0

Z = 1.8

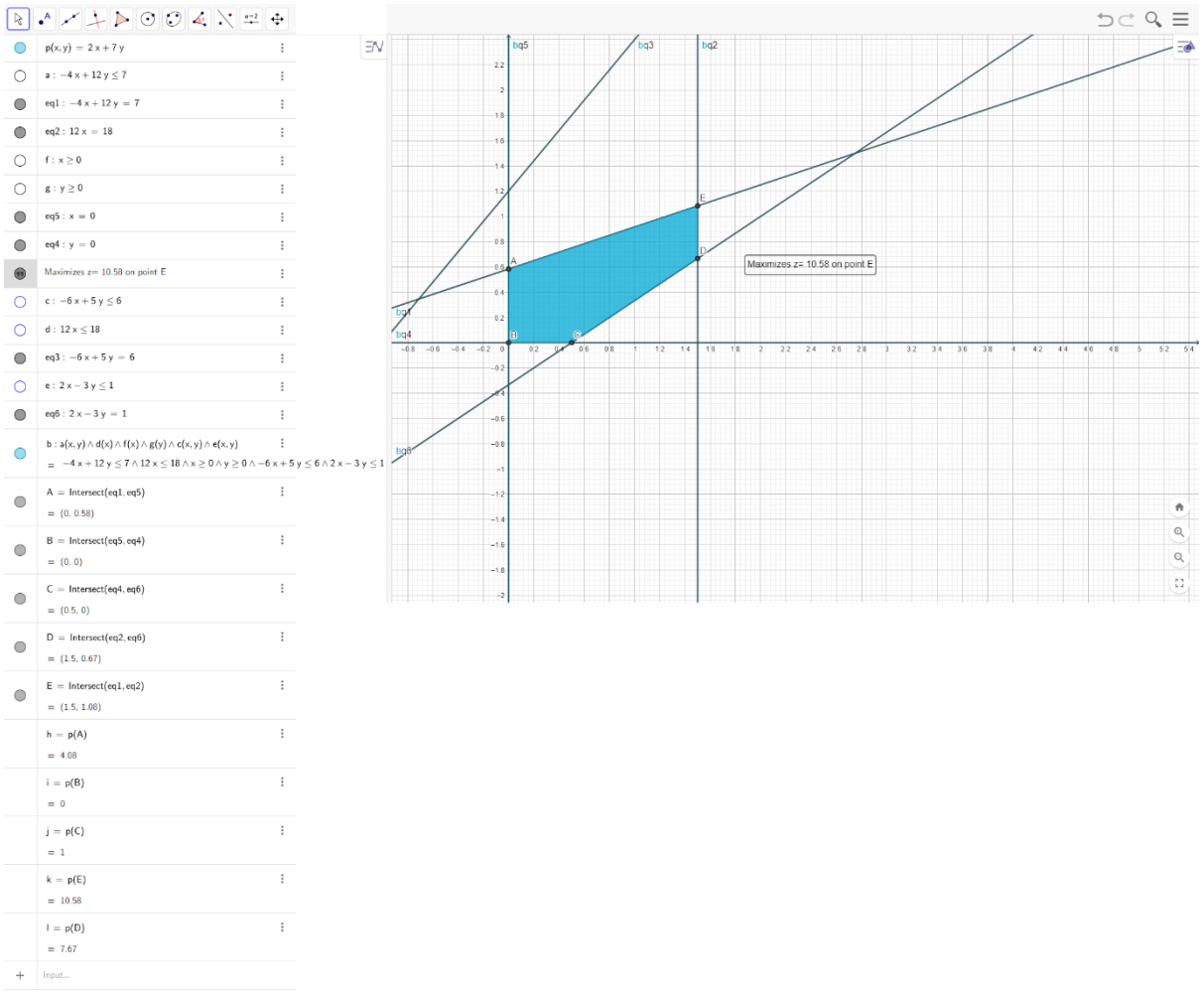
Excel Screenshot:

	A	B	C	D	E	F
1	Variables	x1	x2			
2		0.2	0			
3						
4	Objective	x1	x2	z		
5	Maximize	9	3	1.8		
6						
7	Constraints	x1	x2	Value	InEquality	Constant
8		2	5	0.4	<=	17
9		8	6	1.6	<=	8
10		3	-1	0.6	<=	2
11		5	2	1	<=	1
12		4	1	0.8	<=	4
13		7	0	1.4	<=	14
14						

Question no 3:

Question no 1 using GeoGebra.

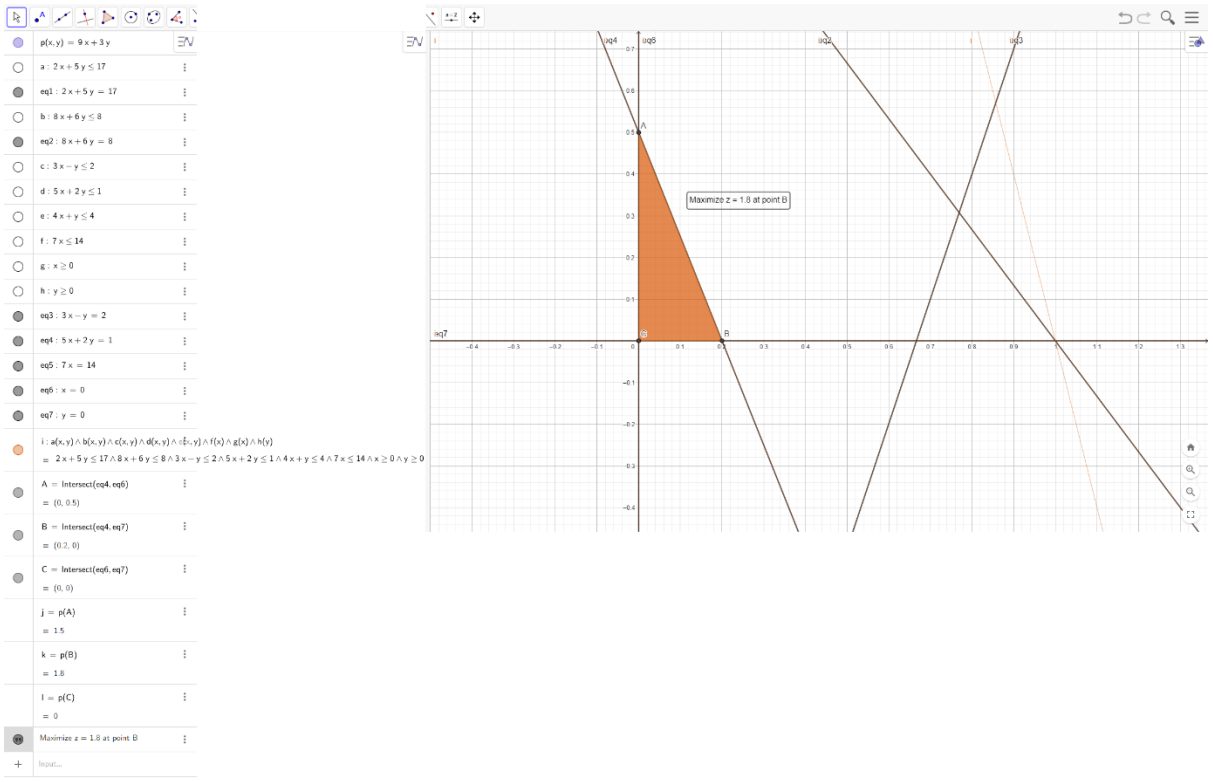
Solution:



Question no 4:

Question no 2 using GeoGebra.

Solution:


p(x, y) = 9 x + 3 y
a : 2 x + 5 y ≤ 17
eq1 : 2 x + 5 y = 17
b : 8 x + 6 y ≤ 8
eq2 : 8 x + 6 y = 8
c : 3 x − y ≤ 2
d : 5 x + 2 y ≤ 1
e : 4 x + y ≤ 4
f : 7 x ≤ 14
g : x ≥ 0
h : y ≥ 0
eq3 : 3 x − y = 2
eq4 : 5 x + 2 y = 1
eq5 : 7 x = 14
eq6 : x = 0
eq7 : y = 0
i : a(x, y) ∧ b(x, y) ∧ c(x, y) ∧ d(x, y) ∧ e(x, y) ∧ f(x) ∧ g(x) ∧ h(y)
= 2 x + 5 y ≤ 17 ∧ 8 x + 6 y ≤ 8 ∧ 3 x − y ≤ 2 ∧ 5 x + 2 y ≤ 1 ∧ 4 x + y ≤ 4 ∧ 7 x ≤ 14 ∧ x ≥ 0 ∧ y ≥ 0
A = Intersect(eq4, eq6)
= (0, 0.5)
B = Intersect(eq4, eq7)
= (0.2, 0)
C = Intersect(eq6, eq7)
= (0, 0)
j = p(A)
= 1.5
k = p(B)
= 1.8
l = p(C)
= 0
Maximize z = 1.8 at point B
Input...
eq4
eq6
eq2
eq3
eq7
A
B
C
Maximize z = 1.8 at point B