

MgtOp 340, Sections 1
Fall 2019
Problem Set 4 Solutions

1.

	A	B	C	D	E	F
1	MgtOp 340, Section 1					
2	Problem Set 4					
3	Problem 1					
4						
5	<u>Month</u>	<u>Month #</u>	<u>Demand</u>		INTERCEPT	25,111.11
6	Jan	1	49,000		SLOPE	8,533.33
7	Feb	2	43,000			
8	Mar	3	38,000			
9	Apr	4	32,000			
10	May	5	86,000			
11	Jun	6	71,000			
12	Jul	7	98,000			
13	Aug	8	94,000			
14	Sep	9	99,000			
15	Oct	10	110,444			
16	Nov	11	118,978			
17	Dec	12	127,511			

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1	MgtOp 340, Section 1					
2	Problem Set 4					
3	Problem 1					
4						
5	<u>Month</u>	<u>Month #</u>	<u>Demand</u>		INTERCEPT	=INTERCEPT(C6:C14,B6:B14)
6	Jan	1	49000		SLOPE	=SLOPE(C6:C14,B6:B14)
7	Feb	2	43000			
8	Mar	3	38000			
9	Apr	4	32000			
10	May	5	86000			
11	Jun	6	71000			
12	Jul	7	98000			
13	Aug	8	94000			
14	Sep	9	99000			
15	Oct	10	=F\$5+B15*F\$6			
16	Nov	11	=F\$5+B16*F\$6			
17	Dec	12	=F\$5+B17*F\$6			

2. $D = 32,000(12) = 384,000$

$S = \$85$

$I = 17\%$

$c = \$8$

a. $Q^* = \sqrt{\frac{2(384,000)(85)}{(.17)(8)}} = \sqrt{\frac{65,280,000}{1.36}} = \sqrt{48,000,000} = 6928 \text{ units}$

$TC^* = \sqrt{2(384,000)(85)(.17)(8)} = \sqrt{88,780,800} = \$9,422$

b. $Q^* = \sqrt{\frac{2(15,360)(85)}{(.17)(8)}} = \sqrt{\frac{2,611,200}{1.36}} = \sqrt{1,920,000} = 1,386 \text{ units}$

$TC^* = \sqrt{2(15,360)(85)(.17)(8)} = \sqrt{35,512,232} = \$1,884$

Total company cost = $25(\$1,884) = \$47,100$.

c. Annual shipping cost for one warehouse = $384,000(\$0.80) = \$307,200$

Annual shipping cost for 25 warehouses = $384,000(\$0.64) = \$245,760$

Total cost for one warehouse = $\$9,422 + \$307,200 = \$316,622$

Total cost for 25 warehouses = $\$47,100 + \$245,760 = \$292,860$

Thus, the decision of 25 warehouses is preferable.

d. The answer is: $TC = \sqrt{N} \sqrt{2DSH}$ (The cost in part b is $\sqrt{25} = 5$ times larger than the cost in part a.)