Solving the Problems

Q = 50 – P

TC = 5Q

Problem I

- Suppose

Q = 50 – P

TC = 5Q

The Answers

- Suppose

Q = 50 – P

TC = 5Q

Q	22.5
P	$27.50
Revenue	$618.75
Cost	$112.50
Profit	$506.25

The Detailed Solution

- Find the value of Q at which MR = MC

Solving Problem I

- Find the value of Q at which MR = MC
  - Find MC
  - Find MR

Marginal Cost

If TC = 5Q, MC = 5

Marginal Revenue

- Find the value of Q at which MR = MC
  - Find MC
  - Find MR

Solve for the inverse demand function
Substitute for P into the revenue function

The Inverse Demand Function

$Q = 50 - P$

$P = 50 - Q$

The Revenue Function

$Q = 50 - P$

$P = 50 - Q$

$R = PQ = (50-Q)Q$

The Revenue Function

$Q = 50 - P$

$P = 50 - Q$

$R = PQ = (50-Q)Q$

$R = 50Q - Q^2$

Marginal Revenue

$R = 50Q - Q^2$

Finding Marginal Revenue

- The derivative of

$$ax^2 + bx + c$$

is

$$2ax + b$$

Finding Marginal Revenue

- The derivative of

$$ax^2 + bx + c$$

is

$$2ax+b$$

$$50Q-Q^2$$

Finding Marginal Revenue

- The derivative of

$$ax^2 + bx + c$$

is

$$2ax+b$$

MR=50-2Q

$$50Q-Q^2$$

Find MR = MC

- MC = 5
- MR = 50- 2Q

$$50 - 2Q = 5$$

Find MR = MC

- MC = 5
- MR = 50- 2Q

$$50 - 2Q = 5$$

$$Q=22.5$$

Finding P

- Since

$$Q = 50 - P$$

$$P = 27.5$$

Q	22.5
P	$27.50
Revenue	$618.75
Cost	$112.50
Profit	$506.25

Revenue

$$Revenue = PQ$$

Q	22.5
P	$27.50
Revenue	$618.75
Cost	$112.50
Profit	$506.25

Cost

$TC = 5Q$

Q	22.5
P	$27.50
Revenue	$618.75
Cost	$112.50
Profit	$506.25

Profit

$\pi = Revenue - Cost$

Q	22.5
P	$27.50
Revenue	$618.75
Cost	$112.50
Profit	$506.25

Problem II

Quantity	Price	Cost
0		6
1	15	11
2	13	16
3	11	21
4	8	26
5	7	31
6	6	36
7	5	41

The Answers

Q	3
P	11
Revenue	33
Cost	21
Profit	12

A spreadsheet approach

Q	P	Revenue =PQ	Marginal Revenue	Cost	Marginal Cost	Profit
0						
1						
2						
3						
4						
5						
6						
7						

A spreadsheet approach

Q	*P*	Revenue =PQ	Marginal Revenue	*Cost*	Marginal Cost	Profit
0				*6*		
1	*15*			*11*		
2	*13*			*16*		
3	*11*			*21*		
4	*8*			*26*		
5	*7*			*31*		
6	*6*			*36*		
7	*5*			*41*		

A spreadsheet approach

Q	P	Revenue =PQ	Marginal Revenue	Cost	Marginal Cost	Profit
0		0		6		
1	15	15		11		
2	*13*	*26*		16		
3	11	33		21		
4	8	32		26		
5	7	35		31		
6	6	36		36		
7	5	35		41		

A spreadsheet approach

Q	P	Revenue =PQ	Marginal Revenue	Cost	Marginal Cost	Profit
0		0		6		
1	15	15	15	11	5	
2	13	26	11	16	5	
3	11	33	7	21	5	
4	8	32	-1	*26*	5	
5	7	35	3	*31*	*5*	
6	6	36	1	36	5	
7	5	35	-1	41	5	

A spreadsheet approach

Q	P	Revenue =PQ	Marginal Revenue	Cost	Marginal Cost	Profit
0		0		6		
1	15	15	15	11	5	
2	13	26	11	16	5	
3	*11*	*33*	*7*	*21*	*5*	
4	8	32	-1	26	5	
5	7	35	3	31	5	
6	6	36	1	36	5	
7	5	35	-1	41	5	

A spreadsheet approach

Q	P	Revenue =PQ	Marginal Revenue	Cost	Marginal Cost	Profit
0		0		6		$6
1	15	15	15	11	5	$4
2	13	26	11	16	5	$10
3	*11*	*33*	*7*	*21*	*5*	*$12*
4	8	32	-1	26	5	$6
5	7	35	3	31	5	$4
6	6	36	1	36	5	$0
7	5	35	-1	41	5	$6

End