PERTEMUAN 2

TEKNIK OPTIMASI DAN PERALATAN MANAJEMEN

POKOK BAHASAN

2.1. Bentuk Hubungan Ekonomi

2.2. Biaya Total, Biaya Rata-Rata dan Biaya Marginal

2.3. Maksimisasi Laba

2.4. Konsep Derivatif dan Kaidah Diferensiasi

2.5. Optimisasi dengan Kalkulus

2.6. Peralatan Manajemen

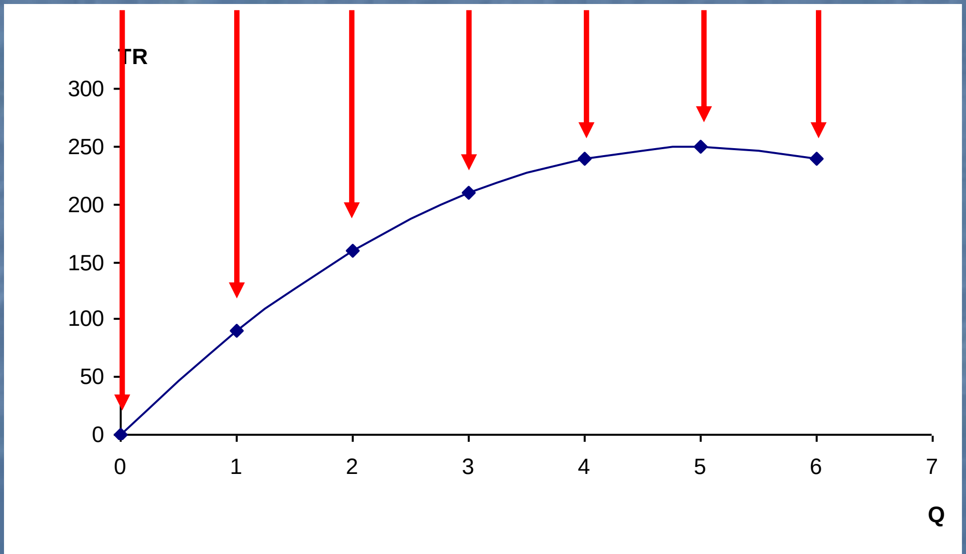
2.1. Bentuk Hubungan Ekonomi

Persamaan: $TR = 100Q - 10Q^2$

Tabel:

Q	0	1	2	3	4	5	6
TR	0	90	160	210	240	250	240

Gambar:

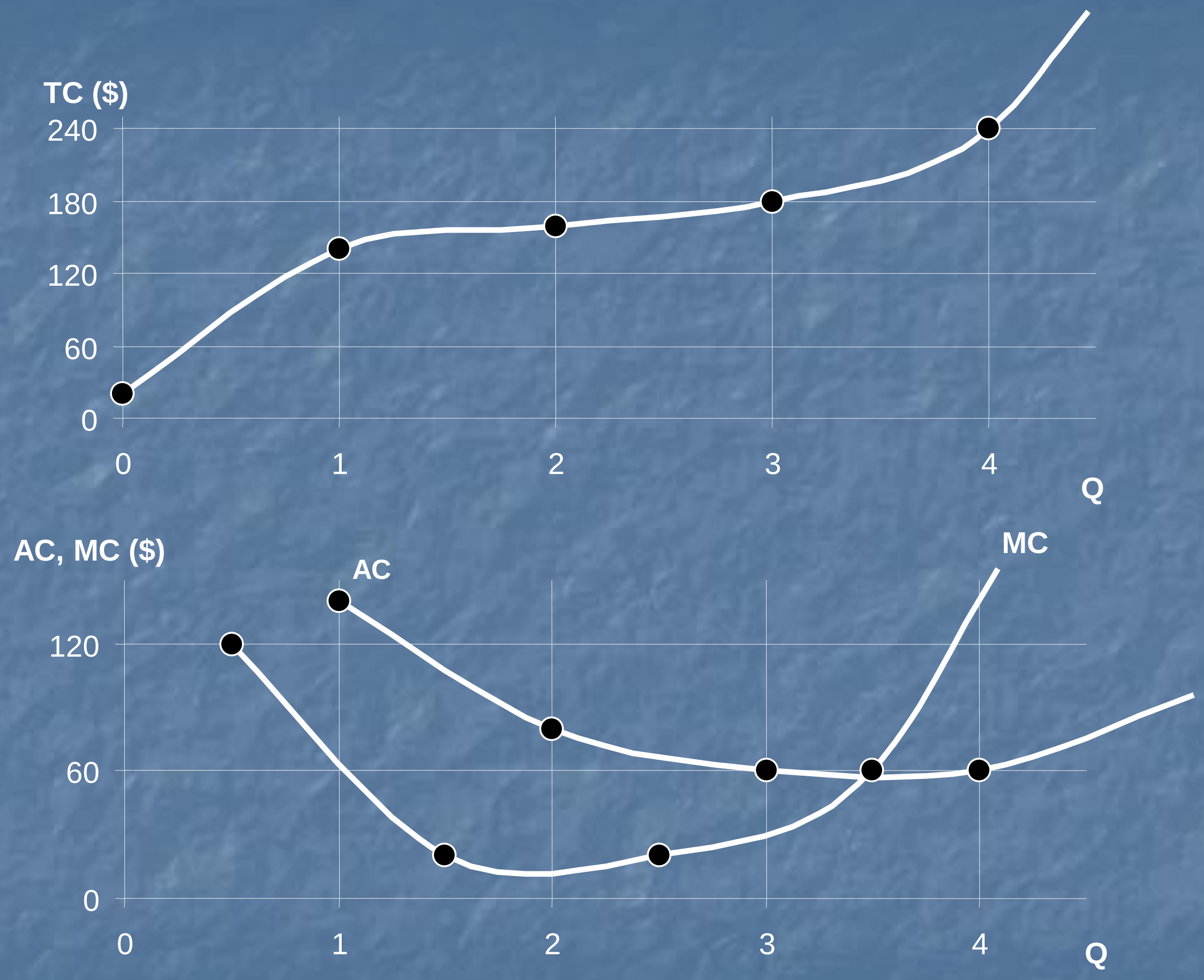


2.2. Biaya Total, Biaya Rata-Rata, dan Biaya Marjinal

AC = TC/Q

MC = ΔTC/ΔQ

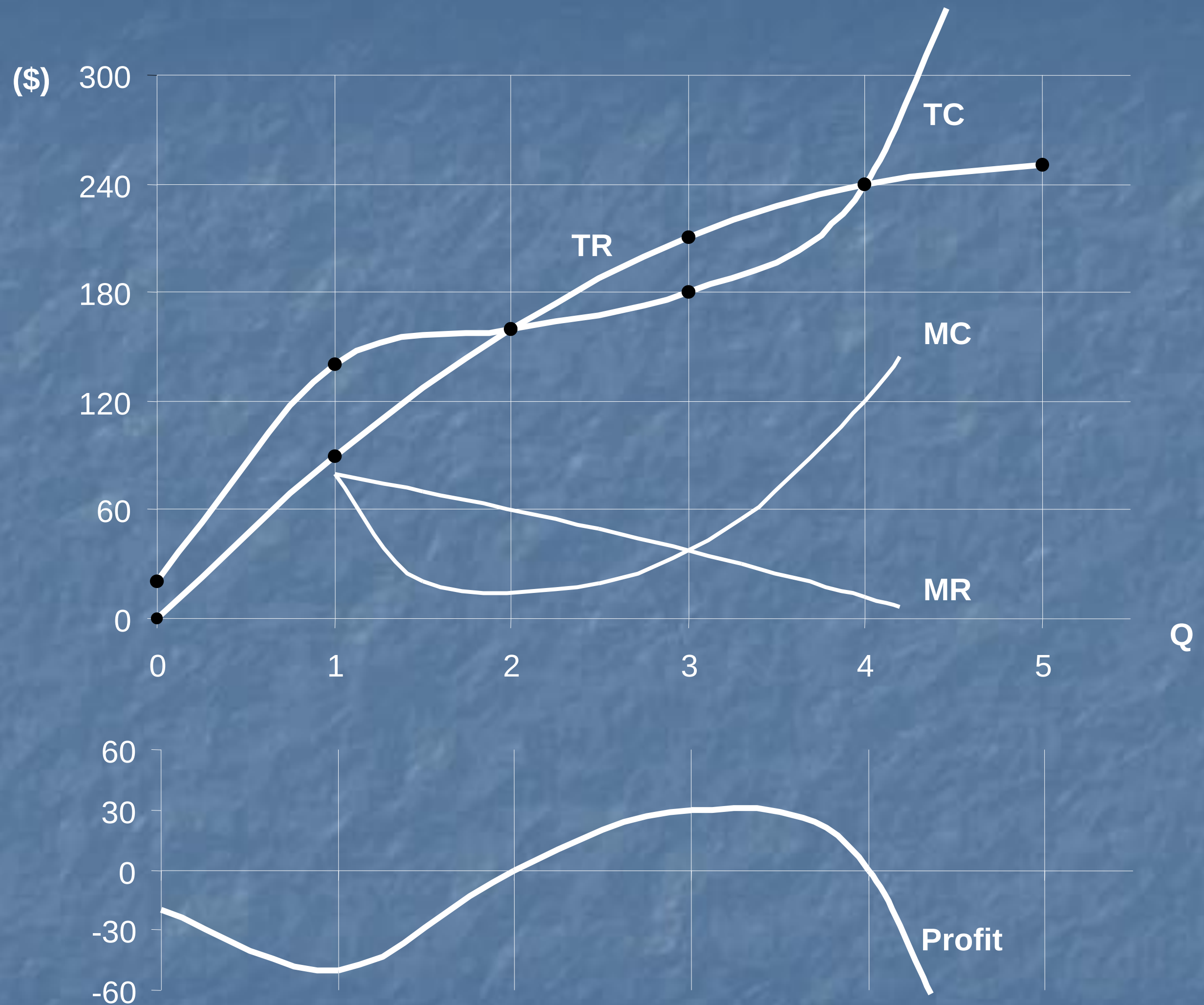
Q	TC	AC	MC
0	20	-	-
1	140	140	120
2	160	80	20
3	180	60	20
4	240	60	60
5	480	96	240



TC ($)
240
180
120
60
0
0
1
2
3
4
Q
AC, MC ($)
AC
MC
120
60
0
0
1
2
3
4
Q

2.3. Maksimisasi Laba

Q	TR	TC	Profit
0	0	20	-20
1	90	140	-50
2	160	160	0
3	210	180	30
4	240	240	0
5	250	480	-230



($)
300
240
180
120
60
0
TC
TR
MC
MR
Q
0
1
2
3
4
5
60
30
0
-30
-60
Profit

2.4. Konsep Derivatif dan Kaidah Diferensiasi

Derivatif dari Y berkenaan dengan X merupakan limit dari rasio $\Delta Y/\Delta X$ dengan ΔX mendekati nol.

Kaidah Diferensiasi

1. Kaidah Fungsi Konstanta

Derivatif dari sebuah konstanta, $Y = f(X) = a$, adalah nol untuk semua nilai a (konstanta).

$$Y = f(X) = a$$

$$\frac{dY}{dX} = 0$$

2. Kaidah Fungsi Pangkat

Derivatif dari sebuah fungsi pangkat, dimana a dan b adalah konstanta, didefinisikan sebagai berikut:

$$Y = f(X) = aX^{b}$$

$$\frac{dY}{dX} = b \cdot aX^{b-1}$$

3. Kaidah Penjumlahan atau Selisih Dua Fungsi

Derivatif dari penjumlahan atau selisih dua fungsi U dan V, didefinisikan sebagai berikut:

$$U = g(X) \qquad V = h(X) \qquad Y = U \pm V$$

$$\frac{dY}{dX} = \frac{dU}{dX} \pm \frac{dV}{dX}$$

4. Kaidah Perkalian Dua Fungsi

Derivatif dari perkalian dua fungsi, U dan V, didefinisikan sebagai berikut:

$U = g(X)$ $V = h(X)$ $Y = U \cdot V$

$$\frac{dY}{dX} = U\frac{dV}{dX} + V\frac{dU}{dX}$$

5. Kaidah Pembagian Dua Fungsi:

Derivatif dari pembagian dua fungsi, U dan V, didefinisikan sebagai berikut:

$$U = g(X) \qquad V = h(X) \qquad Y = \frac{U}{V}$$

$$\frac{dY}{dX} = \frac{V\left({dU}/{dX}\right) - U\left({dV}/{dX}\right)}{V^2}$$

6. Kaidah Fungsi Berantai

Derivatif dari sebuah fungsi yang merupakan sebuah fungsi dari X, didefinsikan sebagai berikut:

$$Y = f(U) \qquad U = g(X)$$

$$\frac{dY}{dX} = \frac{dY}{dU} \cdot \frac{dU}{dX}$$

2.5. Optimisasi dengan Kalkulus

- Syarat Penting:

  Tentukan nilai X yang memenuhi $dY/dX = 0$

- Syarat Cukup:

  (a) Jika $d^2Y/dX^2 > 0$, maka X merupakan nilai minimum.

  (b) Jika $d^2Y/dX^2 < 0$, makaX merupakan nilai maksimum.

2.6. Peralatan Manajemen

- Benchmarking
- Total Quality Management
- Reengineering
- The Learning Organization

Peralatan Manajemen lainnya

- Broadbanding
- Direct Business Model
- Networking
- Pricing Power
- Small-World Model
- Virtual Integration
- Virtual Management

LATIHAN 2

1. A firm's demand function is defined as Q = 14 - 2P. Use this function to calculate total revenue when price is equal to 3 and when price is equal to 4. What is marginal revenue equal to between P=3 and P=4?

2. A firm's demand function is defined as Q = 30 - P. Use this function to calculate total revenue when price is equal to 5 and when price is equal to 6. What is marginal revenue equal to between P=5 and P=6?

3. A firm's demand function is defined as Q = 30 - 2P. Use this function to calculate total revenue when price is equal to 10 and when price is equal to 11. What is marginal revenue equal to between P=10 and P=11?

4. Use the production relationship between total product (Q) and units of labor (L) employed that is presented in the table below to calculate the average and marginal product of labor when L = 5.

L	1	2	3	4	5	6	7	8	9
Q	3	7	13	17	20	22	23	23	22

5. Use the total cost (TC) schedule that is presented in the table below to calculate average total cost, average variable cost, average fixed cost, and marginal cost when output (Q) is equal to 5.

Q	0	1	2	3	4	5	6	7	8	9
TC	5	7	8	10	14	20	28	38	50	72

6. Use the total cost (TC) schedule that is presented in the table below to determine the optimal rate of production when the firm can sell all of the output it produces at a price of $10 per unit. Also determine the level of profit (or loss) that the firm will experience at this level of output.

Q	0	1	2	3	4	5	6	7	8	9
TC	5	7	8	10	14	20	28	38	50	72

7. Use the total cost (TC) schedule that is presented in the table below to determine the optimal rate of production when the firm can sell all of the output it produces at a price of $6 per unit. Also determine the level of profit (or loss) that the firm will experience at this level of output.

Q	0	1	2	3	4	5	6	7	8	9
TC	15	17	18	20	24	30	38	48	60	82

8. Use the demand schedule that is presented in the table below to determine the optimal rate of production and price when the firm has a constant marginal cost of $10 per unit.

Quantity	1	2	3	4	5	6	7	8	9	10
Price	80	60	48	40	34	29	25	20	15	10

9. Use the demand schedule that is presented in the table below to determine the optimal rate of production and price when the firm has the following marginal cost function: MC = 1 + Q/2.

Quantity	1	2	3	4	5	6	7	8	9	10
Price	80	60	48	40	34	29	25	20	15	10

10. A firm's demand function is Q = 16 - P and its total cost function is defined as $TC = 3 + Q + 0.25\ Q^2$. Use these two functions to form the firm's profit function and then determine the level of output that yields the profit maximum. What is the level of profit at the optimum?

11. A firm's demand function is defined as Q = 20-2P. Use this function to calculate total revenue when price is equal to 3 and when price is equal to 4. What is marginal revenue equal to between P=3 and P=4?

12. A firm's demand function is defined as $Q = 40 - P$. Use this function to calculate total revenue when price is equal to 5 and when price is equal to 6. What is marginal revenue equal to between $P=25$ and $P=26$?

13. A firm's demand function is defined as $Q = 100 - 5P$. Use this function to calculate total revenue when price is equal to 10 and when price is equal to 12. What is marginal revenue equal to between $P=10$ and $P=12$?

14. Use the production relationship between total product (Q) and units of labor (L) employed that is presented in the table below to calculate the average and marginal product of labor when $L = 4$.

L	1	2	3	4	5	6	7	8	9
Q	2	5	11	16	20	22	23	23	22

15. Use the total cost (TC) schedule that is presented in the table below to calculate average total cost, average variable cost, average fixed cost, and marginal cost when output (Q) is equal to 4.

Q	0	1	2	3	4	5	6	7	8	9
TC	3	6	8	11	15	20	26	34	55	70

16. Use the total cost (TC) schedule that is presented in the table below to determine the optimal rate of production when the firm can sell all of the output it produces at a price of $6 per unit. Also determine the level of profit (or loss) that the firm will experience at this level of output.

Q	0	1	2	3	4	5	6	7	8	9
TC	3	6	8	11	15	20	26	34	55	70

17. Use the total cost (TC) schedule that is presented in the table below to determine the optimal rate of production when the firm can sell all of the output it produces at a price of $8 per unit. Also determine the level of profit (or loss) that the firm will experience at this level of output.

Q	0	1	2	3	4	5	6	7	8	9
TC	15	17	18	20	24	30	38	48	60	82

18. Use the demand schedule that is presented in the table below to determine the optimal rate of production and price when the firm has a constant marginal cost of $16 per unit.

Quantity	1	2	3	4	5	6	7	8	9	10
Price	80	60	48	40	34	29	25	20	15	10

19. Use the demand schedule that is presented in the table below to determine the optimal rate of production and price when the firm has the following marginal cost function: $MC = 1 + Q$.

Quantity	1	2	3	4	5	6	7	8	9	10
Price	80	60	48	40	34	29	25	20	15	10

20. A firm's demand function is $Q = 40 - 2P$ and its total cost function is defined as $TC = 100 + 2Q + 0.25\,Q^2$. Use these two functions to form the firm's profit function and then determine the level of output that yields the profit maximum. What is the level of profit at the optimum level of output?