Ficha 5 - Mercados e Formação de preços

1) $\pi = \left(-\frac{1}{3}\right) Q^3 \cdot -3Q^2 + 40Q - 50$

$Q_D = 12 - 0,2P \quad \curvearrowright \quad P = 60 - 5Q_D$

a) $\pi' = \left(-\frac{3}{3}\right) Q^2 - 6Q + 40$

$\dfrac{\pi'}{Q'} = 0 \quad \Longleftrightarrow \quad \dfrac{-Q^2 - 6Q + 40}{\ } = 0$

$\Longleftrightarrow \quad Q = -10 \quad \vee \quad Q = 4$

como $Q > 0$, $\quad \underline{\underline{Q = 4}}$

$4 = Q_D$

$\Longleftrightarrow \quad 4 = 12 - 0,2P$

$\Longleftrightarrow \quad P = \dfrac{4 - 12}{-0,2} = 40 \quad u.m.$

$\pi(4) \approx 40,6(6) \quad v.m.$

b)

$\pi = RT - CT$

$\Longleftrightarrow \quad \pi = P_x Q - (CV + CF)$

$\Longrightarrow \quad \left(-\frac{1}{3}\right) Q^3 - 3Q^2 + 40Q - 50 = PQ - CT$

$\Longleftrightarrow \quad \pi \qquad\qquad\qquad = (60 - 5Q)Q - CT$

$\Longleftrightarrow \quad CT = 60Q - 5Q^2 + \left(\frac{1}{3}\right)Q^3 + 3Q^2 - 40Q + 50$

$\Longleftrightarrow \quad CT = \underbrace{\frac{1}{3}Q^3 - 2Q^2 + 20Q}_{CV} + \underbrace{50}_{CF}$

$CVM = \dfrac{CV}{Q} = \frac{1}{3}Q^2 - 2Q + 20$

$\boxed{\left| CVM' = 0 \right|} \quad \Longleftrightarrow \quad \dfrac{\partial CVM}{\partial Q}$

$\Longleftrightarrow \quad \frac{2}{3}Q - 2 = 0$

$\Longrightarrow \quad Q = \dfrac{2 \times 3}{2} \qquad \Longleftrightarrow \quad Q = 3 \text{ unidades}$

2) $RMg = 21 - 2Q$ u.m.

a) $RMg = \dfrac{\partial RT}{\partial Q} \Leftrightarrow RT = \int RMg \; dQ$

$$RT = \int (21 - 2Q)\, dQ = \int 21 \, dQ - \int 2Q \, dQ$$

$$= 21Q - Q^2$$

$$RT = P \cdot Q$$

$\Leftrightarrow 21Q - Q^2 = P \cdot Q$

$\Leftrightarrow 21 - Q = P$

$\Leftrightarrow \boxed{Q = 21 - P}$

b) $CMg = Q^2 - 6Q + 9 \qquad\qquad CF = 16$

$CMg = \dfrac{\partial CT}{\partial Q} \Rightarrow CT = \int CMg \; dQ$

$$CT = \underbrace{\frac{1}{3}Q^3 - 3Q^2 + 9Q}_{CV} \quad \underbrace{+ C}_{= \frac{1}{6}16 \atop CF} \qquad , \; C \in \mathbb{R}$$

$C + M = \dfrac{CT}{Q}$

$$= \frac{1}{3}Q^2 - 3Q + 9 + \frac{16}{Q}$$

b.2) Maximização do lucro : $\dfrac{\partial \pi}{\partial Q} = 0 \Leftrightarrow RMg = CMg$

$\Leftrightarrow \quad 21 - 2Q = Q^2 - 6Q + 9$

$\Leftrightarrow \quad Q^2 - 4Q - 12 = 0 \qquad \Leftrightarrow \quad Q = -2 \; \lor \; Q = 6$

$Q = 21 - P \Rightarrow 6 = 21 - P \Leftrightarrow P = 15$ u. mm

$$\pi = RT - CT = PQ - \left(\frac{1}{3}Q^3 - 3Q^2 + 9Q + 16 \right)$$

$$= 6 \times 15 - 34$$

$$= 90 - 34$$

$$= \underline{56} \quad \text{u. m}$$

3] CF = 600 u.m

RT = 10 Q

Quando Q = 100 π = 0

π = RT - CT

(=) π = 10 × Q - CT

(=) 0 = 10 × 100 - CT

(=) CT = 1000

(=) 600 + CVT = 1000

(=) CVT = 400

$$CV = \frac{400}{100} = 4 \text{ u.m.}$$

4] P = 5 u.m.   Q = 2000 unidades   Mercado de concorrência perfeita

CT = Q^3 + - $6Q^2$ + 5Q - 100   curto prazo   P = CMg

                                                          CMg = RMg

$$CMg = \frac{\partial CT}{\partial Q} = 3Q^2 - 12Q + 5$$

P = CMg

(=) 5 = $3Q^2$ - 12Q + 5   (=) $3Q^2$ - 12Q = 0   ⟺ 3Q (Q - 4)

(=) Q = 0 ∨ Q = 4

π_{Max} = RT - CT = P × Q - CT

= 5 × 4 - (4^3 - 6 × 4^2 + 5 × 4 - 100)

= 132 u.m

$$N^\circ \text{ de empresas} = \frac{2000}{4} = 500 \text{ empresas}$$

5] Mercado de concorência Perfeita   Longo prazo:

Maximizar – lucro: $CMg = CMT$

$$CT = Q^3 - 10Q^2 + 125Q$$

$\begin{cases} Preço & P = CTM \\ T=0 & RT = CT \end{cases}$

$$CTM = \frac{CT}{Q} = Q^2 - 10Q + 125$$

$$CMg = \frac{\partial CT}{\partial Q} = 3Q^2 - 20Q + 125$$

$$CMg = CTM$$

$(\Leftrightarrow)$ $Q^2 - 10Q + 125 = 3Q^2 - 20Q + 125$

$(\Leftrightarrow)$ $Q^2(3-1) + Q(-20 + 10) = 0$

$(\Leftrightarrow)$ $Q(2Q - 10) = 0$

$(\Leftrightarrow)$ $\cancel{Q=0}$ $\vee$ $\underline{Q = 5}$

$$P = CTM = 5^2 - 10 \times 5 + 125$$

$$= \underline{\underline{100}} \; u.m$$

6] $CT = Q^3 - 6Q^2 + 15Q + 100$

$$RT = 51Q$$

$P \times \cancel{Q} = 51 \cancel{Q}$ $(\Leftrightarrow)$ $\underline{\underline{P = 51}}$

Maximizar lucro: $RMg = CMg$

• $RMg = \frac{\partial RT}{\partial Q} = 51$

• $CMg = \frac{\partial CT}{\partial Q} = 3Q^2 - 12Q + 15$

○ $RMg = CMg$

$(\Leftrightarrow)$ $51 = 3Q^2 - 12Q + 15$ $(\Leftrightarrow)$ $3Q^2 - 12Q - 36 = 0$ $\therefore Q = -2 \vee \underline{\underline{Q = 6}}$

$\pi_{max} = RT - CT$

$= 51 \times 6 - (6^3 - 6 \times 6^2 + 15 \times 6 + 100)$

$= 306 - 190 = \underline{\underline{116}} \; u.m$ $\rightarrow$ (lucro Total)

$\pi_{unitário} = \frac{\pi_{max}}{Q} = \frac{116}{6} \approx 19,(3) \; u.m \, / \, unidade$

7)

$$CTM = \frac{Q^2}{3} - 3Q + 38 + \frac{16}{Q}$$

$$RMg = 62 - 4Q$$

$$RMg = \frac{\partial RT}{\partial Q} \iff RT = \int RMg$$

$$\iff \frac{RT}{} = 62Q - 2Q^2$$

$$\iff P \times Q = 62Q - 2Q^2$$

$$\iff P = 62 - 2Q \iff \boxed{Q = -\frac{1}{2}P + 31}$$

b)

Maximizar lucro: $RMg = CMg$

· $CTM = \frac{CT}{Q} \iff CT = \frac{Q^3}{3} - 3Q^2 + 38Q + 16$

· $CMg = \frac{\partial CT}{\partial Q} = Q^2 - 6Q + 38$

· $RMg = CMg \iff 62 - 4Q = Q^2 - 6Q + 38$

$$\iff Q^2 - 2Q - 24 = 0$$

$$\iff Q = -4 \quad \vee \quad Q = 6$$

· $RT = P \times Q = \overset{P}{(62 - 2 \times 6)} 6 = 300 \; u.m$

· $\Pi_{máx} = 300 - \left(\frac{6^3}{3} - 3 \times 6^2 + 38 \times 6 + 16 \right)$

$$= 300 - 208$$

$$= \underline{\underline{92}} \; u.m$$

R: $P = 50 \; u.m \qquad Q = 6 \; u.m$

$$\Pi \, máx = 92 \; u.m.$$

8)

$CFM = \dfrac{350}{Q} \quad \Leftrightarrow \quad CF = 350$

$CVM = 20q + 80 \quad \Leftrightarrow \quad CV = 20Q^2 + 80Q$

$Q_D = 5,6 - \dfrac{P}{100} \quad \Leftrightarrow \quad P = 560 - 100Q$

a) __Maximizar lucro__ : $RMg = CMg$

$CT = 20Q^2 + 80q + 350$

- $CMg = \dfrac{\partial CT}{\partial Q} = 40Q + 80$

- $RT = P \times Q = (560 - 100Q) Q = 560Q - 100Q^2$

- $RMg = \dfrac{\partial RT}{\partial Q} = 560 - 200Q$

- $RMg = CMg \Leftrightarrow 40Q + 80 = 560 - 200Q \Leftrightarrow 240Q = 480$

$\Leftrightarrow \quad \underline{Q = 2}$

$P = 560 - 100 \times 2 \quad \Leftrightarrow \quad \boxed{P = 360 \text{ u.m}}$

- $\pi_{max} = RT - CT = 560 \times 2 - 100 \times 2^2 - (20 \times 2^2 + 80 \times 2 + 350)$

$= 720 - 590 = \underline{130 \text{ u.m}}$

b) __Maximizar vendas__ : $\dfrac{\partial RT}{\partial Q} = 0$

- $\dfrac{\partial RT}{\partial Q} = 0 \Leftrightarrow 560 - 200Q = 0 \quad \Leftrightarrow \quad \boxed{Q = \dfrac{560}{200} = 2,8 \text{ u.m}}$

- $P = 560 - 100 \times 2,8 = \underline{280 \text{ u.m}}$

- $\pi_{max} = RT - CT$

- $560 \times 2,8 - 100 \times 2,8^2 - (20 \times (2,8)^2 + 80 \times (6,8) + 350)$

$= 784 - 730,8$

$= \underline{53,2 \text{ u.m}}$