3 Kosten- und Preistheorie

Englische Aufgaben

3.1 For a certain product the cost function is $K(x) = 0.0003x^3 - 0.12x^2 + 190x + 240$ and the selling price p = 205 GE/ME.

a. Compute the inflection point of the cost function.
b. Compute the operational optimum and the average and marginal costs at the operational optimum.
c. Compute the break-even-point and the profit limit.
d. Compute maximal profit and the production amount for which the maximal profit is achieved.

[operational optimum … Betriebsoptimum; marginal costs … Grenzkosten; profit limit … Gewinngrenze; production amount … Produktionsmenge; profit … Gewinn]

3.2 A company has a cost function K with $(x) = 0.02x^3 - 4.8x^2 + 420x + 200$, the maximal capacity of production is 115 UQ.

a. Compute the minimum efficient scale (MES) of production, as well as the average and marginal costs at the MES.
b. Calculate the turning point of the cost curve.
c. Determine the average and marginal costs at the turning point.
d. Plot the cost curve and determine the area of progressive/declining cost.

[UQ (units of quantity) … Mengeneinheiten; minimum efficient scale (MES) of production… Betriebsoptimum; average costs … Durchschnittskosten; marginal costs … Grenzkosten; to plot … graphisch darstellen; area … Bereich; progressive/declining cost … progressive/degressiver Kostenverlauf]

3.3 A company has a cubic cost function K with fixed costs of 5500 MU. The overall costs for an output of 200 UQ are 16 300 MU. For an output of 10 UQ, the unit costs are 562.2 MU, and the marginal costs are 10.6 MU.

a. Determine the cost function K(x).
b. Calculate the shutdown point x_{SD} and the corresponding shutdown price (i.e., the variable average costs at the shutdown point).
c. Compute the MES and the long-run minimum floor.

[cubic function … Funktion 3. Grades; fixed costs … Fixkosten; monetary unit (MU) … Geldeinheiten; unit of quantity (UQ)… Mengeneinheit; overall costs … Gesamtkosten; output … Produktionsmengen; unit costs … Stückkosten; shutdown point … Betriebsminimum; shutdown price = short-run minimum floor … kurzfristige Preisuntergrenze; i.e. (id est) … das heißt; minimum efficient scale … Betriebsoptimum; long-run minimum floor … langfristige Preisuntergrenze]

3.4 For a certain product the overall costs for an output of 70 UQ are 6057.5 MU, for an output of 100 UQ the costs are 8000 MU. For an output of 20 UQ the variable unit costs are 11 MU and the marginal costs are 13 MU.

a. Assume a cubic cost function and calculate its coefficients.
b. Determine whether the costs are progressive, declining or S-shaped for $x \in [0; 150]$.
c. Calculate the minimum efficient scale and the marginal costs at this point.
d. Calculate the long-run minimum floor.

[long-run minimum floor … langfristige Preisuntergrenze; unit costs … Stückkosten; declining … degressiv; marginal costs … Grenzkosten]

3.5 Consider a cost function K with $K(x) = 0.005x^3 - 0.4x^2 + 14x + 950$.The price for a product is 35 MU/UQ and the revenue function R(x) is modelled by a homogeneous linear function.
a. Compute the break-even point and the profit zone.
b. Calculate the maximal profit, and the output for which the profit is maximal.
c. Determine the marginal costs for the output with maximal profit.
d. Plot the cost function K, the revenue function R and the profit function P for $x \in [0; 110]$.

[revenue function … Erlösfunktion; homogeneous … homogen; profit zone … Gewinnbereich; profit … Gewinn; output … Produktionsmenge; marginal costs … Grenzkosten; to plot … graphisch darstellen]

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3.6 **a.** If the price for a certain product is cut by 10% the demand is increased by 4%. Calculate the PED and describe the consequences of the price reduction for the sales volume.
b. For a price of 50 MU the demand is 120 unit quantities. If the price is cut to 45 MU, the demand increases to 135 UQ. Compute the PED for a price of 50 MU and describe the consequences of price reduction for the sales volume.
[to cut a price … Preis senken; price reduction … Preissenkung; sales volume … Umsatz]

3.7 The functions p_S and p_D for supply and demand of a certain product are known with $p_{S(x)} = 0.12x^2 - 4x + 80$ and $p_{D(x)} = -0.05x^2 - x + 400$.
a. Compute the market equilibrium, i.e., the equilibrium quantity and the market clearing price.
b. Determine the price ceiling and the quantity of saturation.
c. Calculate the price elasticity of demand (PED) for a sales quantity of 60 UQ.
d. Calculate the PED at a price of 280 MU/UQ.
e. Plot supply and demand.
[supply … Angebot; demand … Nachfrage; market equilibrium … Marktgleichgewicht; i.e. (id est) … das heißt; equilibrium quantity … Gleichgewichtsmenge; market clearing price … Gleichgewichtspreis; price ceiling … Höchstpreis; quantity of saturation … Sättigungsmenge; price elasticity of demand … Absatzelastizität; sales quantity … Absatz]

3.8 A demand function is given by $p_{D(x)} = -0.05x^2 + 200$.
a. Calculate the price and output for which the revenue R becomes maximal and compute the maximal revenue.
b. Determine price ceiling and quantity of saturation.
c. Determine the PED at the point with maximal revenue.

3.9 The cost function K(x) and the demand function p_D of a monopolistic company are known with $K(x) = 0.03x^3 - 0.2x^2 + 25x + 2500$ and $p_{D(x)} = 645 - 10x$.

a. Compute the Cournot point and the maximal profit.
b. Calculate price and output for which the revenue becomes maximal, and compute the maximal revenue.
c. Calculate the break-even point and the profit zone.
d. Determine the PED at the Cournot point.
e. Plot the functions for cost, revenue and profit.

3.10 The cost function of a company is $K(x) = 0.001x^3 0.175x^2 + 124x + 120$. The price ceiling is 32 and at a production quantity of 50 UQ, the price is 28 MU.

a. Determine the linear demand function p_D.
b. Compute the quantity of saturation.
c. Determine the profit zone.
d. Calculate the Cournot point and the maximal profit.