

Introduction to Mathematical Economics, ORMS1030

Exercise 1, week 3 (Jan 12–16, 2015)

R1	ma	10–12	F119	R5	ti	14–16	C209
R2	ma	14–16	B209	R6	to	10–12	C209
R3	ti	08–10	C209	R7	pe	08–10	D115
R4	ti	12–14	C209	R8	pe	10–12	D115

1. Simplify and find the values of the following expressions. First work by pen and paper, and then by calculator.

$$\text{a) } \frac{3}{4} - \frac{1}{8} \quad \text{b) } \frac{\frac{1}{4}}{\frac{1}{2} - \frac{2}{5}} \quad \text{c) } \frac{5/3}{2/4 \cdot 3} \cdot \frac{4}{5} \quad \text{d) } \frac{4}{1 + \frac{8}{3}}$$

2. Simplify and find the values of the following expressions. First work by pen and paper, and then by calculator.

$$\text{a) } 25^2 + 2 \cdot 5^2 \quad \text{b) } 25^{-1} + 25^0 \quad \text{c) } (0,2)^{-2} \cdot 2^2$$

3. Solve the equations. Use integers and fractions in your calculations. Finally give the root as decimal number by three digits.

$$x + \frac{1}{2} = 1 - \frac{x}{7}$$

4. Solve the equations

$$\text{a) } 5 - x = 8 - 5x, \quad \text{b) } 3(2x + 1) = 6(x - 1), \quad \text{c) } 4x^2 + 5x + 1 = 0.$$

5. A firm purchase 4,25 ton raw material and pays €1500 for it. The raw material is wet with 15,1% moisture content (viz 15,1 percent of the weight is water). To the raw material the firm add 120kg dry colour pigment and water as much to get 20,0% moisture content.

- Find the total mass of material after the addition of dry colour pigment and water.
- Find the unit cost of the coloured material. Price for the pigment is 3,20 €/kg and water is free of charge.
- Find the percentage of pigment cost relative to the total cost of coloured material.

6. The firm sells its product in price 125€. Profit (revenue - production cost) is 12,50€ for one product (i.e. 10,0% of sale). The price of raw material for one product is 72,50€. The price of raw material decrease by 10,00%. Other costs of production (labor, fixed cost, etc.) remains unchanged.

- Find the increment of profit for one product as amount of euros.
- Find the persental increase of the profit.
- Find the increment of percentage of the profit relative to sale (in percentage points).
- How do change the percentage of raw material cost relative to the total production cost?

[Some answers: 1a) $5/8 = 0,625$ 1b) $5/2 = 2,5$ 1c) $8/9 \approx 0,889$ d) $12/11 \approx 1,091$
2a) 675 2b) 1,04 2c) 100.]