

## Exercises Tuesday

### Chapter 2: Algebra

#### § 6 Inequalities

- Solve the inequalities for  $x$ :
  - $2x + 3 > 11$
  - $8 - 3x < 2$
  - $5x + 9 \leq 7x + 15$
  - $\frac{2x + 3}{-3} < 5$

#### § 8 Sign Diagrams

- Use a sign diagram to solve the following inequalities:
  - $\frac{t-2}{t-6} \geq 0$
  - $\frac{3t+6}{t-2} < 4$
  - $3x^2 \leq 12$
- Solve the inequalities. Use a sign diagram.
  - $(t+3)(2-t) \leq 0$
  - $(3-x)^2(x+1) > 0$
  - $\frac{6x-12}{x} < x+6$
  - $x + \frac{2}{x} > -3$ , hint:  $x^2 + 3x + 2 = (x+2)(x+1)$
- Decide if the following inequalities are valid for all  $x$ :
  - $(x-1)^2 - 1 \geq -2x$
  - $4-x \geq 3-x$
  - $5 \leq 6$
  - $x-2 \geq -\frac{1}{x}$ , be careful!  
Is a sign diagram useful here?

### Chapter 3: Solving Equations

#### § 1 Solving Equations

- Solve each equation
  - $5x + 12 = 2$
  - $\frac{1}{3}x + \frac{1}{6} = 4$
  - $\frac{2x+3}{3} + 1 = 2x$
  - $\frac{3}{2x+1} = \frac{6}{4x+2}$ , be careful!
  - $\frac{3}{2x+1} = \frac{6}{6x+2}$
  - $\sqrt{18-2x} = 16$

#### § 3 Quadratic Equations

- Solve the following quadratic equations (if they have solutions):
  - $x^2 - 5x = 0$
  - $t^2 = 36$
  - $u^2 - 9 = 0$
  - $5x^2 - 130 = -5$
  - $x(x-3) = 0$
  - $(t+3)(t-5) = 0$
  - $(x+3)^2 = 9$
- Solve the following quadratic equations:
  - $x^2 - 5x + 6 = 0$
  - $x^2 - 5x + 4 = 0$
  - $x^2 - 4x + 4 = 0$
  - $x^2 - 7x + 6 = 0$
- Use the quadratic formula to solve:
  - $x^2 - 3x - 10 = 0$
  - $2x^2 - 6x + 3 = 0$
  - $x^2 + 5x - 2 = 0$
- Factorize:
  - $3x^2 - 3x - 18$
  - $x^2 - 3x + 1$

#### § 4 Some Nonlinear Equations

- Solve the equations and verify the solutions:
  - $x(x+6) = 0$
  - $x^2(2-3x)(2+x^2) = 0$
  - $x(x-5) = x-5$
  - $\sqrt{6-3x} = 0$
  - $\frac{x^2+1}{(x+1)(x-1)} = 0$
  - $\frac{x^2-1}{x^2+1} = 0$

§ 6 Two Linear Equations in Two Unknowns

1. Solve the following systems of linear equations:

a.  $\begin{cases} x - 3y = -1 \\ 2x + 3y = 7 \end{cases}$     b.  $\begin{cases} x - 3y = 0 \\ 2x + y = 14 \end{cases}$     c.  $\begin{cases} 3x - 4y = -1 \\ 2x + 3y = 5 \end{cases}$

2. First formulate a system of equations, after that answer the formulated question.

- a. The sum of two numbers is 15 and the difference is 3. Determine the numbers.  
b. Four burgers and seven milk shakes cost € 31, whereas seven burgers and five milk shakes cost € 35.40. What is the price of one burger and of one milk shake?

Review 1. Solve each of the equations:

a.  $5x + 5 = -15$     b.  $-2(4x - 5) - 4(2x + 6) = -8(3 + 2x)$   
c.  $-\frac{12x - 8}{4} = x + 2$     d.  $\frac{12x - 8}{6} = 3x - 4$   
e.  $\frac{2}{x - 1} - \frac{1}{x - 1} = \frac{2}{x - 2}$     f.  $4\sqrt{6 - x} = 2 + 3\sqrt{6 - x}$

Continue with the following problems in the book:

- Chapter 2, § 6: Problems 1, 3.
- Chapter 2, § 8: Problem 2.
- Chapter 3, § 1: Problems 1, 3.
- Chapter 3, § 3: Problems 2, 3, 6 (a) and (b).
- Chapter 3, § 4: Problem 2.
- Chapter 3, § 6: Problem 2.