

Inhoud / Contents

Basiswiskunde / Basic Mathematics, 2DL03

Course 2008 - 2009, Semester 2

Version 27 January 2009

The material for the examination can be found in

- Calculus, A Complete Course, Richard A. Adams, Sixth Edition, Pearson

The mentioned sections belong to the material for the examination unless indicated otherwise.

Exercises have been selected for almost every section. The underlined ones constitute a minimal set to understand the subject matter. The other chosen exercises are suitable to get a better understanding of the material

Make the underlined exercises.

- Dictaat Rekenvaardigheden (Dutch), TU/e, dictaatnummer 2589, 20 juni 2007.

The mentioned series of exercises belong to the material for the examination.

You can find most of the related information in Dutch also in the book of Adams.

Alternative sources to improve computational skills and basic knowledge of mathematics are

- Foundation Maths, Anthony Croft and Robert Davison, Fourth Edition, Pearson
- Basisvaardigheden Wiskunde voor het HTO, Douwe Jan Douwes en Jaap Grasmeijer, Wolters-Noordhoff

Calculus, A Complete Course, Adams

■ P Preliminaries

Voorspel

□ P1 Real Numbers and the Real Line (EM)

Reële getallen en de reële lijn

Exercises 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35

□ P2 Cartesian Coordinates in the Plane (EM)

Cartesische coördinaten in het vlak

Exercises 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 47, 48, 49

Self-tuition

□ P3 Graphs of Quadratic Equations (EM)

Grafieken bij kwadratische vergelijkingen

Exercises 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 48, 49

□ P4 Functions and Their Graphs (EM)

Functies en grafieken

Exercises 5, 6, 7, 13, 15, 19, 21, 22, 37, 39, 41, 43, 46, 47, 53

□ P5 Combining Functions to Make New Functions (EM)

Samenstelling van functies

Exercises 1, 3, 5, 7 a c e g, 9, 13, 15, 19, 20, 21, 22, 23, 24, 27, 33

□ P6 Polynomials and Rational Functions (EM)

Polynomen en rationale functies

Exercises $1^{(1)}$, $3^{(1)}$, $5^{(1)}$, $7^{(1)}$, $9^{(1)}$, $11^{(1)}$, 13, 14, 15, 16

Note (1):

Write each polynomial as a product of linear and quadratic positive definite factors with real coefficients:

Remarks

You must be able to write simple polynomials as a product of linear and of quadratic positive definite factors with real coefficients.

- Complex numbers are not discussed in Basic Mathematics.

- **P7 The Trigonometric Functions (EM)**
Goniometrische functies

Exercises 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 23, 25, 27, 29, 31, 33, 35, 37

- **1 Limits and Continuity**
Limieten en continuïteit

- **1.2 Limits of Functions (EM)**
Limieten van functiewaarden

Exercises 1, 3, 5, 9, 13, 17, 21, 27, 29, 33, 59, 67

- **1.4 Continuity (EM)**
Continuïteit

Exercises 13, 15, 17, 21, 23, 29, 30, 31

- **2 Differentiation**
Differentiatie

- **2.2 The Derivative (EM)**
De afgeleide

Exercises 1, 5, 29, 43

- **2.3 Differentiation Rules (EM)**
Differentiatieregels

Exercises 1, 5, 11, 15, 19, 21, 23, 35, 43, 45

Self-tuition

- **2.4 The Chain Rule (EM)**
De kettingregel

Exercises 1, 3, 7, 9, 11, 13, 25, 33, 34

- **2.6 The Mean-Value Theorem (EM)**
De middelwaardestelling

Exercises 2, 5, 7, 12, 13

The part "Proof of the Mean-Value Theorem", p129 - p130, is no subject matter.

□ **2.8 Higher-Order Derivatives (EM)**

Hogere orde afgeleiden

Exercises 3, 7, 11, 13, 15⁽¹⁾, 19⁽¹⁾, 28

Note (1): Leave out the task "Then verify your guess using mathematical induction"

□ **2.9 Implicit Differentiation (EM)**

Impliciete differentiatie

Exercises 1, 3, 5, 7, 9, 11, 17

□ **2.10 Antiderivatives and Initial-Value Problems (EM)**

Primitiveren

Exercises 1, 3, 5, 7, 9, 11, 13, 15, 17, 21, 23, 25

The part "Differential Equations and Initial-Value Problems" starting below Example 4 on page 148 ending with Example 9 on page 150 is no examination matter.

■ **3 Transcendental Functions**

Transcendente functies

□ **3.1 Inverse Functions (EM)**

Inversen

Exercises 1, 3, 5, 7, 9, 11, 13, 17, 19, 21, 23, 25, 29

□ **3.2 Exponential and Logarithmic Functions (EM)**

De exponentiële functies en de logaritmen

Exercises 1, 3, 5, 7, 9, 11, 13, 15, 17, 23, 25, 27, 29

□ **3.3 The Natural Logarithm and Exponential (EM)**

De natuurlijke logaritme en de exponentiële functie

Exercises 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 39, 47

□ **3.5 The Inverse Trigonometric Functions (EM)**

De cyclometrische functies

Exercises 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 35, 39, 47,

■ 4 Some Applications of Derivatives Enkele toepassingen van afgeleiden

□ 4.7 Linear Approximations (EM) Lineaire benaderingen

Exercises 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21

□ 4.8 Taylor Polynomials (EM) Taylorpolynomen

Exercises 1, 3, 5, 7, 9, 11, 13, 19, 21, 23, 25

■ 5 Integration Integratie

□ 5.1 Sums and Sigma Notation Sommen en de sigma-notatie

Self-tuition

Exercises 3, 7, 15, 33

□ 5.2 Areas as Limits of Sums De oppervlakte als limiet van sommen

Self-tuition

No exercises

□ 5.3 The Definite Integral De bepaalde integraal

Self-tuition

No exercises

□ 5.4 Properties of the Definite Integral (EM) Eigenschappen van de bepaalde integraal

Exercises 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 31, 33, 35, 41

□ 5.5 The Fundamental Theorem of Calculus (EM) De hoofdstelling van Calculus

Exercises 1, 3, 5, 7, 9, 11, 13, 15, 23, 28, 29, 33, 39, 41, 43, 45

□ 5.6 The Method of Substitution (EM)

Substitutie

Exercises 1, 2, 3, 5, 6, 7, 9, 12, 13, 14, 15, 19, 20, 21, 35, 40, 41, 43

- **6 Techniques of Integration**
Integratietechnieken

- **6.1 Integration by Parts (EM)**
Partiële integratie

Exercises 1, 2, 3, 5, 10, 13, 16, 19, 20, 21, 29

Dictaat Rekenvaardigheden

Course notes Computational Skills

Make the mentioned series of exercises. If there is no specific reference to material in the book of Adams, then you must look up information in another book.

You must be able to solve similar questions.

- H 2, Machten, serie A, p 4

See Calculus, Adams, Section 3.1

- H 3, Herleiden,

3.1, Haakjes wegwerken, serie A, p 6

3.2, Ontbinden in factoren, serie A, p 7

See Calculus, Adams, Section P.6

3.3, Ontbinden in factoren, vervolg, serie A, p 8

See Calculus, Adams, Section P.6

- H 4, Breuken, serie A, p 10

No information in Calculus, Adams

- H 5, Goniometrie, serie A, p 12

See Calculus, Adams, Section P.7

- H 6, Goniometrische formules,

6.1, Basisformules, serie A, p 16

See Calculus, Adams, Section P.7

6.2, Ontbinden, serie A, p 17

See Calculus, Adams, Section P.7

6.3, Bewijzen, serie A, p 18

See Calculus, Adams, Section P.7

□ H 7, Differentiëren,

7.1, Rekenregels voor differentiëren, serie A, p 22

See Calculus, Adams, Section 1.2 and 1.4

□ H 8, Primitiveren, serie A, p 24

See Calculus, Adams, Section 1.10

□ H 9, Grafieken tekenen, series A t/m F, p 28

See Calculus, Adams, Section P.4

□ H 10, Vergelijkingen en ongelijkheden

10.1, Polynoomvergelijkingen, serie A, p 30

See Calculus, Adams, Section P.7

10.2, Polynoomongelijkheden, serie A, p 33

10.3, Breukvergelijkingen, serie A, p 35

10.4, Breukongelijkheden, serie A, p 37

10.5, Exponentiële vergelijkingen, serie A, p 39

See Calculus, Adams, Sections 3.2 and 3.3

10.7, Logaritmische vergelijkingen, serie A, p 43

See Calculus, Adams, Sections 3.2 and 3.3

10.9, Goniometrische vergelijkingen en ongelijkheden, serie A, p 47

See Calculus, Adams, Section P.7

10.10, Wortelvergelijkingen, serie A, p 49