

**Antwoorden Instructie-opgaven
voor Calculus voor schakelprogramma van Bouwkunde (2DB03)**

Kwartiel 1, Week 1.1

§0.1

(2) $x > -2$

(6) $-2 < x < -\frac{1}{2}$

(10) $-\frac{5}{2} < x < \frac{3}{2}$

(12) niet colineair

(15) (a) $\sqrt{20} = 2\sqrt{5}$
(b) 2
(c) $y = 2x$

(19) (2, 5), $y = 2(x - 1) + 3$ ofwel $y = 2x + 1$

(23) parallel

(25) loodrecht op elkaar

(31) (a) $y = 2(x - 3) + 1$ ofwel $y = 2x - 5$
(b) $y = -\frac{1}{2}(x - 3) + 1$ ofwel $y = -\frac{1}{2}x + \frac{5}{2}$

(46) $-3 < x \leq -2$ of $2 \leq x < 3$, anders geschreven: $(-3, -2] \cup [2, 3)$

(47) $x \neq 1$ en $x \neq -1$, ofwel $\mathbb{R} \setminus \{-1, 1\}$

§Extra Opgaven

(1) $x > -\frac{2}{3}$

(2) $-\frac{1}{2} < x < 2$

(3) $-2 < x < 3$

(4) $2 < x < 4$

(5) $x < -2 \vee x > 2$

(6) $x < -1 \vee x > 0$

Kwartiel 1, Week 1.2

§0.1

(66) $(x + 4)(x - 3)$; $x_1 = -4$, $x_2 = 3$

(68) $(x + 1 + \frac{1}{2}\sqrt{6})(x + 1 - \frac{1}{2}\sqrt{6})$; $x_1 = -1 - \frac{1}{2}\sqrt{6}$, $x_2 = -1 + \frac{1}{2}\sqrt{6}$

(69) $x(x - 1)(x - 2)$; $x_1 = 0$, $x_2 = 1$, $x_3 = 2$

(72) $(x + 2)(x + 1)(x - 1)$; $x_1 = -2$, $x_2 = -1$, $x_3 = 2$

§0.3

(3) $f(g(x)) = 2 \left(\sqrt[3]{\frac{x-1}{2}} \right)^3 + 1 = 2 \left(\frac{x-1}{2} \right) + 1 = (x - 1) + 1 = x$
 $g(f(x)) = \sqrt[3]{\frac{(2x^3+1)-1}{2}} = \sqrt[3]{\frac{2x^3}{2}} = \sqrt[3]{x^3} = x$

(4) $f(g(x)) = \frac{1}{\frac{1-2x}{x}+2} = \frac{1}{(\frac{1}{x}-2)+2} = \frac{1}{\frac{1}{x}} = x$
 $g(f(x)) = \frac{1-2\frac{1}{x+2}}{\frac{1}{x+2}} = \frac{(x+2)-2}{1} = x$

(8) $f^{-1}(x) = (x - 4)^{\frac{1}{5}}$

(9) niet één-op-één

(10) niet één-op-één

(11) $g(x) = \sqrt[3]{x^2 - 1}$

(13) (a) $f^{-1}(-1) = 0$
(b) $f^{-1}(4) = 1$

(17) (a) 2
(b) 0

Kwartiel 1, Week 2.1

§0.4

$$(33) \sin(\alpha - \beta) = \sin(\alpha + (-\beta)) = \sin(\alpha) \cos(-\beta) + \sin(-\beta) \cos(\alpha) = \sin(\alpha) \cos(\beta) - \sin(\beta) \cos(\alpha)$$

$$(34) \cos(\alpha - \beta) = \cos(\alpha + (-\beta)) = \cos(\alpha) \cos(-\beta) - \sin(\alpha) \sin(-\beta) = \cos(\alpha) \cos(\beta) + \sin(\alpha) \sin(\beta)$$

(47) Wegens de stelling van Pythagoras bestaat er een β zodanig dat $\cos(\beta) = \frac{4}{5}$ en $\sin(\beta) = \frac{3}{5}$ en dus voldoet aan $5 \cos(x + \beta) = 5 \cos(\beta) \cos(x) - 5 \sin(\beta) \sin(x) = 4 \cos(x) - 3 \sin(x)$.
Schatting: $\beta = \arcsin(\frac{4}{5}) \approx 0,6435$

(48) Wegens de stelling van Pythagoras bestaat er een β zodanig dat $\cos(\beta) = \frac{2}{\sqrt{5}}$ en $\sin(\beta) = \frac{1}{\sqrt{5}}$ en dus voldoet aan $\sqrt{5} \sin(x + \beta) = \sqrt{5} \sin(\beta) \cos(x) + \sqrt{5} \cos(\beta) \sin(x) = 2 \sin(x) + \cos(x)$.
Schatting: $\beta = \arcsin(\frac{1}{\sqrt{5}}) \approx 0,4636$

$$(53) \frac{2}{3} \sqrt{2}$$

$$(55) -\frac{1}{2} \sqrt{3}$$

§Extra Opgaven

$$(1) x = \frac{\pi}{2}(\text{mod}\pi) \vee x = \pi(\text{mod}2\pi)$$

$$(2) x = \frac{\pi}{2}(\text{mod}\pi) \vee x = 0(\text{mod}2\pi)$$

$$(3) x = \frac{\pi}{6}(\text{mod}2\pi) \vee x = \frac{5\pi}{6}(\text{mod}2\pi) \vee x = \frac{\pi}{2}(\text{mod}2\pi)$$

Kwartiel 1, Week 2.2

§0.4

$$(37) \arccos(0) = \frac{\pi}{2}$$

$$(38) \arctan(0) = 0$$

$$(39) \arcsin(-1) = -\frac{\pi}{2}$$

$$(40) \arccos(1) = 0$$

$$(42) \arctan(-1) = -\frac{\pi}{4}$$

$$(57) \cos(\arcsin(x)) = \sqrt{1-x^2}, \quad -1 \leq x \leq 1$$

$$(58) \text{ voor alle } x \in \mathbb{R} \text{ geldt: } \cos(\arctan(x)) = \frac{1}{\sqrt{1+x^2}}$$

$$(61) \sin(\arccos(\frac{1}{2})) = \frac{1}{2}\sqrt{3}$$

$$(62) \cos(\arcsin(\frac{1}{2})) = \frac{1}{2}\sqrt{3}$$

$$(63) \tan(\arccos(\frac{3}{5})) = \frac{4}{3}$$

Kwartiel 1, Week 3.1

§0.5

(27) $x = \frac{1}{2} \ln 2$

(31) $x = e^{-2}$

(33) $x = 2$

(38) (a) $\log_4 \frac{1}{16} = -2$
(b) $\log_4 2 = \frac{1}{2}$
(c) $\log_9 3 = \frac{1}{2}$

(44) $3 \ln 2 - \ln \frac{1}{2} = \ln 16$

(45) $\ln \frac{3}{4} + 4 \ln 2 = \ln 12$

(49) $f(x) = 4e^{(\frac{1}{2} \ln \frac{1}{2})x}$

(50) $f(x) = 5e^{x \ln \frac{2}{5}}$

§Extra Opgaven

(1) $x = \ln(2 + \sqrt{5})$

(2) $x = \ln(y + \sqrt{y^2 + 1})$

(3) $x = \frac{1}{2} \ln 3$

(4) $x = 0$ of $x = \ln 4$

Kwartiel 1, Week 3.2

§1.2

(21) bestaat niet

(22) bestaat niet

§1.3

$$(2) \lim_{x \rightarrow 2} \sqrt[3]{2x+1} = \sqrt[3]{5}$$

$$(4) \lim_{x \rightarrow 2} \frac{x-5}{x^2+4} = -\frac{3}{8}$$

$$(7) \lim_{x \rightarrow 2} \frac{x^2-x-2}{x^2-4} = \frac{3}{4}$$

$$(8) \lim_{x \rightarrow 1} \frac{x^3-1}{x^2+2x-3} = \frac{3}{4}$$

$$(9) \lim_{x \rightarrow 0} \frac{\sin x}{\tan x} = 1$$

$$(11) \lim_{x \rightarrow 0} \frac{x e^{-2x+1}}{x^2+x} = e$$

$$(13) \lim_{x \rightarrow 0} \frac{\sqrt{x+4}-2}{x} = \frac{1}{4}$$

(23) De limiet bestaat niet.

$$(29) \lim_{x \rightarrow 0} x^2 \sin(1/x) = 0$$

$$(31) \lim_{x \rightarrow 0^+} \sqrt{x} \cos^2(1/x) = 0$$

$$(37) \lim_{x \rightarrow 0^+} \frac{\sqrt{1-\cos x}}{x} = \frac{1}{2}\sqrt{2}$$

$$(38) \lim_{x \rightarrow 0} \frac{1-\cos^2 x}{x^2} = 1$$

§1.4

- (13) continu voor alle $x \neq 1$, functie is niet uit te breiden tot een overall continue functie
- (19) $\lim_{x \rightarrow 2} f(x) \neq f(2)$
- (21) f is continu op $[-3, \infty)$.
- (26) f is continu op $(2k\pi, 0\pi + 2k\pi)$ met k geheel.
- (37) Op het getoonde interval $[-7, 7]$ zijn er discontinuïteiten voor $x = -2$, $x = 1$ en $x = 4$.

§1.5

- (1) $\lim_{x \rightarrow 1} \frac{1-2x}{x^2-1}$ bestaat niet.
- (6) $\lim_{x \rightarrow -1^-} (x^2 - 2x - 3)^{-2/3}$ bestaat niet.
- (9) $\lim_{x \rightarrow \infty} \frac{x^2+3x-2}{3x^2+4x-1} = \frac{1}{3}$.
- (15) $\lim_{x \rightarrow \infty} e^{-2/x^3} = 0$.
- (20) $\lim_{x \rightarrow \infty} \sin(\arctan(x)) = \sin(\pi/2) = 1$.
- (23b) Horizontale asymptoot: $y = -1$
Verticale asymptoten: $x = -2$ en $x = 2$. Er geldt $\lim_{x \rightarrow -2^-} f(x) = -\infty$, $\lim_{x \rightarrow -2^+} f(x) = \infty$,
 $\lim_{x \rightarrow 2^-} f(x) = \infty$ en $\lim_{x \rightarrow 2^+} f(x) = -\infty$.

Kwartiel 1, Week 4.1

§2.1

(3) $y = -7(x + 2) + 10$ ofwel $y = -7x - 4$

(13) C, B, A, D

(15) (a) $-9,8 \text{ m/s}$ (b) $-19,6 \text{ m/s}$

(27) $y = -(x - \pi)$ ofwel $y = -x + \pi$

(29) geen raaklijn

§2.2

(6) $f'(x) = 2x - 2$

(11) $f'(t) = \frac{3}{2\sqrt{3t+1}}$

(22) $f'(0)$ bestaat en is gelijk aan 2

(32) $a = 2$

(37) $f'(1), \frac{f(\frac{3}{2})-f(1)}{\frac{1}{2}}, f(2) - f(1), f(1)$

§2.3

(1) $3x^2 - 2$

(3) $9t^2 - \frac{1}{\sqrt{t}}$

(6) $-\frac{8}{y^5} - 3y^2$

(10) $3\pi t^{\pi-1} - 2.6t^{0.3}$

(12) $\frac{12x^2-x-3}{2x\sqrt{x}}$

(14) $1 \cdot (3x^2 - 4) + (x + 1) \cdot 6x = 9x^2 + 6x - 4$

(17) $\frac{d^2 f(x)}{dx^2} = 24x^2 - \frac{9}{4}x^{-\frac{5}{2}}$

(19) $f^{(4)}(x) = 24 - \frac{105}{8}x^{-9/2}$

(22) $v(t) = -9.8t + 12$ en $a(t) = -9.8$

(29) $y = -x + 4$

Kwartiel 1, Week 4.2

§2.4

- (1) $f'(x) = 2x(x^3 - 3x + 1) + (x^2 + 3)(3x^2 - 3)$
- (3) $f'(x) = \left(\frac{1}{2\sqrt{x}} + 3\right) \left(5x^2 - \frac{3}{x}\right) + (\sqrt{x} + 3x) \left(10x + \frac{3}{x^2}\right)$
- (4) $f'(x) = \left(\frac{3}{2}x^{\frac{1}{2}} - 4\left(x^4 - \frac{3}{x^2} + 2\right) + \left(x^{\frac{3}{2}} - 4x\right)\left(4x^3 + \frac{6}{x^3}\right)\right)$ vereenvoudigd is dit gelijk aan $\frac{11}{2}x^4\sqrt{x} - 20x^4 + \frac{3}{2x\sqrt{x}} - \frac{12}{x^2} - 8$
- (5) $\frac{3(5t+1)-(3t-2)5}{(5t+1)^2} = \frac{13}{(5t+1)^2}$
- (6) $f'(x) = \frac{-7x^2 - 8x + 27}{(x^2 - 5x + 1)^2}$
- (7) $f'(x) = \frac{(3 - \frac{3}{\sqrt{x}})(5x^2 - 2) - 10x(3x - 6\sqrt{x})}{(5x^2 - 2)^2}$
- (13) $\frac{4}{3}t^{\frac{1}{3}} + 3$
- (20) $y = -\frac{2}{3}(x - 1) + 2$ ofwel $y = -\frac{2}{3}x + \frac{8}{3}$
- (22) (a) $y = -x - 1$, (b) $y = -\frac{4}{9}x - \frac{1}{3}$
- (33) $(f(x)g(x)h(x))' = f'(x)g(x)h(x) + f(x)g'(x)h(x) + f(x)g(x)h'(x)$
 $\left(\prod_{i=1}^n f_i(x)\right)' = \sum_{i=1}^n \left(f_i'(x) \prod_{\substack{j=1 \\ j \neq i}}^n f_j(x)\right)$
- (35) $f'(x) = \frac{2}{3}x^{-\frac{1}{3}}(x^2 - 2)(x^3 - x + 1) + 2x^{\frac{5}{3}}(x^3 - x + 1) + x^{\frac{2}{3}}(x^2 - 2)(3x^2 - 1)$

§2.5

- (1) $f'(x) = 6x^2(x^3 - 1) = 6x^5 - 6x^2$
- (5) $f'(x) = \frac{x}{\sqrt{x^2+4}}$
- (6) (a) $f'(x) = 4(x^3 + x - 1)(3x^2 + 1)$, (b) $f'(x) = \frac{1}{2\sqrt{4x - \frac{1}{x}}}\left(4 - \frac{-1}{x^2}\right) = \frac{4 + \frac{1}{x^2}}{2\sqrt{4x - \frac{1}{x}}}$
- (8) $f'(t) = \frac{11}{6}t^{5/6} + \frac{3}{2}t^{-1/2} = \frac{11t^{4/3} + 9}{6\sqrt{t}}$
- (17) $\frac{1}{f'(0)} = \frac{1}{4}$
- (18) $\frac{1}{4}$
- (22) $\frac{3}{10}$

§2.6

- (2) $f'(x) = 8x - \frac{6}{\cos^2(2x)}$
- (5) $f'(x) = \cos(5x^2) - 10x^2 \sin(5x^2)$
- (7) $f'(x) = \frac{2x^2 \cos(x^2) - 2 \sin(x^2)}{x^3}$
- (11) $f'(x) = \frac{-4}{\tan(4x) \sin(4x)} = -\frac{4 \cos(4x)}{\sin^2(4x)}$
- (13) $f'(x) = 4 \cos^2(2x) - 4 \sin^2(2x) = 4 \cos(4x)$

Kwartiel 1, Week 5.1

§2.7

$$(2) f'(x) = 2e^{2x} \cos(4x) - 4e^{2x} \sin(4x) = e^{2x}(2 \cos(4x) - 4e^{2x} \sin(4x))$$

$$(3) f'(x) = 1 + 2^x \ln(2)$$

$$(7) f'(x) = -2x \ln(3) \left(\frac{1}{3}\right)^{x^2}$$

$$(14) f'(x) = \frac{1}{2x}$$

$$(16) f'(x) = x^2(3 \ln(x) + 1)$$

$$(17) f'(x) = -\tan(x)$$

$$(21) (a) f'(x) = e^x \left(\ln(x) + \frac{1}{x}\right), \quad (b) 1 \quad (x > 0)$$

§2.8

$$(3) y'(0) = 0$$

$$(5) y'(x) = \frac{4-2xy^2(x)}{3+2x^2y(x)}$$

$$(11) y'(x) = \frac{1-2xy(x)e^{x^2y(x)}}{x^2e^{x^2y(x)}-e^{y(x)}}$$

$$(13) y'(x) = \frac{16x\sqrt{x+y(x)}-(y(x))^2}{4xy(x)+5(y(x))^2-2\sqrt{x+y(x)}}$$

$$(29) (a) f'(x) = \frac{3x^2}{\sqrt{1-(x^3+1)^2}} = \frac{3x^2}{\sqrt{-x^6-2x^3}} \quad (b) f'(x) = \frac{2}{\sqrt{x-x^2}}$$

$$(31) (a) f'(x) = \frac{1}{2\sqrt{x(1+x)}} \quad (b) f'(x) = \frac{-1}{x^2+1}$$

Kwartiel 1, Week 5.2

§3.3

- (7) 0 geen van beide; $\frac{9}{4}$ lokaal minimum
- (13) $-2 + \sqrt{2}$ lokaal minimum; $-2 - \sqrt{2}$ lokaal maximum
- (16) $\frac{1}{2}$ lokaal maximum
- (19) $-\frac{2}{3}$ lokaal minimum; -1 eindpunt
- (25) (a) -1 minimum; 3 maximum (b) -17 minimum; 3 maximum

§3.4

- (3) $-2 < x < 0$, $x > 2$ stijgend; $x < -2$, $0 < x < 2$ dalend
 ± 2 lokaal minimum; 0 lokaal maximum
- (14) 0 lokaal minimum; 1 lokaal maximum
- (17) $\frac{1}{\sqrt[3]{2}}$ lokaal maximum
- (20) -1 lokaal minimum

§3.5

- (9) kritiek punten: -3 (minimum), $x = 0$ (buigpunt)
- (11) $x = 1$ (maximum)
- (14) geen kritieke punten

Kwartiel 1, Week 6.1

§4.1

$$(5) \int (3x^4 - 3x) dx = \frac{3}{5}x^5 - \frac{3}{2}x^2 + c$$

$$(6) \int (x^3 - 2) dx = \frac{1}{4}x^4 - 2x + c$$

$$(7) \int (3\sqrt{x} - \frac{1}{x^4}) dx = 2x^{\frac{3}{2}} + \frac{1}{3}x^{-3} + c$$

$$(9) \int \frac{x^{\frac{1}{2}} - 3}{x^{\frac{3}{2}}} dx = \frac{3}{2}x^{\frac{2}{3}} - 9x^{\frac{1}{3}} + c$$

$$(10) \int \frac{x+2x^{\frac{3}{4}}}{x^{\frac{5}{4}}} dx = \frac{4}{3}x^{\frac{3}{4}} + 4x^{\frac{1}{2}} + c$$

$$(11) \int (2 \sin x + \cos x) dx = -2 \cos x + \sin x + c$$

$$(17) \int (3e^x - 2) dx = 3e^x - 2x + c$$

$$(20) \int (2x^{-1} + \sin x) dx = 2 \ln |x| - \cos x + c$$

$$(21) \int \frac{4x}{x^2+4} dx = 2 \ln |x^2 + 4| + c$$

$$(25) \int \frac{e^x}{e^x+3} dx = \ln |e^x + 3| + c$$

$$(26) \int \frac{e^x+3}{e^x} dx = x - 3e^{-x} + c$$

$$(28) \int x^{\frac{2}{3}}(x^{-\frac{4}{3}} - 3) dx = 3x^{\frac{1}{3}} - \frac{9}{5}x^{\frac{5}{3}} + c$$

§4.3

$$(1) \text{ (a) Evaluatiepunten: } \frac{1}{8}, \frac{3}{8}, \frac{5}{8}, \frac{7}{8}; \text{ Riemannsom: } \frac{85}{64} = 1,328125$$

$$\text{ (b) Evaluatiepunten: } \frac{1}{4}, \frac{3}{4}, \frac{5}{4}, \frac{7}{4}; \text{ Riemannsom: } \frac{37}{8} = 4,625$$

$$(3) \text{ (a) Evaluatiepunten: } \frac{\pi}{8}, \frac{3\pi}{8}, \frac{5\pi}{8}, \frac{7\pi}{8} \\ \text{ Riemannsom: } \frac{\pi}{4}(\sin \frac{\pi}{8} + \sin \frac{3\pi}{8} + \sin \frac{5\pi}{8} + \sin \frac{7\pi}{8}) \approx 2,05234$$

$$\text{ (b) Evaluatiepunten: } \frac{\pi}{16}, \frac{3\pi}{16}, \frac{5\pi}{16}, \frac{7\pi}{16}, \frac{9\pi}{16}, \frac{11\pi}{16}, \frac{13\pi}{16}, \frac{15\pi}{16}; \text{ Riemannsom: } \\ \frac{\pi}{8}(\sin(\frac{\pi}{16}) + \sin(\frac{3\pi}{16}) + \sin(\frac{5\pi}{16}) + \sin(\frac{7\pi}{16}) + \sin(\frac{9\pi}{16}) + \sin(\frac{11\pi}{16}) + \sin(\frac{13\pi}{16}) + \sin(\frac{15\pi}{16})) \approx \\ 2,01291$$

$$(11) \text{ (a) } \frac{4}{3}, \text{ (b) } \frac{14}{3}, \text{ (c) } \frac{32}{3}$$

$$(14) \text{ (a) } \frac{5}{6}, \text{ (b) } \frac{8}{3}, \text{ (c) } \frac{92}{3}$$

$$(27) A_2$$

§4.4

$$(15) \int_{-2}^2 (4 - x^2) dx = \frac{32}{3}$$

$$(17) -\int_{-2}^2 (x^2 - 4) dx = \frac{32}{3}$$

$$(20) \int_{-\pi/2}^0 (-\sin(x)) dx + \int_0^{\pi/4} \sin(x) dx = 2 - \frac{1}{2}\sqrt{2}$$

$$(23) 13$$

$$(27) \frac{10}{3}$$

$$(28) \frac{1}{3}$$

$$(35) \text{ (a) } \int_0^3 f(x) dx \text{ , (b) } \int_0^2 f(x) dx$$

$$(37) \text{ (a) } 1 \text{ , (b) } 8$$

$$(38) \text{ (a) } 5 \text{ , (b) } -17$$

Kwartiel 1, Week 6.2

§4.5

- (3) 0
- (5) $\frac{62}{5} + 3 \ln(4)$
- (8) $-e^{-2} - 3$
- (15) $3 - 3 \ln(4)$
- (17) $e^t - 1$
- (25) $f'(x) = x^2 - 3x + 2$
- (27) $f'(x) = 2x(e^{-x^4} + 1)$
- (31) $f'(x) = 3x^2 \sin(3x^3) - 2x \sin(3x^2)$

§4.6

- (1) $\int x^2 \sqrt{x^3 + 2} dx = \frac{2}{9}(x^3 + 2)^{\frac{3}{2}} + c$
- (4) $\int \sin(x) \cos(x) dx = \frac{1}{2} \sin^2(x) + c$
- (9) $\int t^2 \cos(t^3) dt = \frac{1}{3} \sin(t^3) + c$
- (13) $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx = 2e^{\sqrt{x}} + c$
- (15) $\int \frac{\sqrt{\ln(x)}}{x} dx = \frac{2}{3}(\ln(x))^{\frac{3}{2}} + c$
- (27) $\int \frac{2t+3}{t+7} dx = 2t - 11 \ln|t+7| + c$
- (31) $\int_0^2 x \sqrt{x^2 + 1} dx = \frac{5}{3} \sqrt{5} - \frac{1}{3}$
- (34) $\int_0^2 x^2 e^{x^3} dx = \frac{1}{3}(e^8 - 1)$
- (38) $\int_1^e \frac{\ln(x)}{x} dx = \frac{1}{2}$

Kwartiel 1, Week 7.1

§6.1

$$(5) \frac{1}{a}e^{ax} + c$$

$$(8) \frac{1}{6}x^6 + 2x^4 + 8x^2 + c$$

$$(9) \frac{3}{4} \arctan\left(\frac{x}{4}\right) + c$$

$$(11) \arcsin\left(\frac{x+1}{2}\right) + c$$

$$(13) 2 \arctan\left(\frac{x+1}{2}\right) + c$$

$$(14) 2 \ln(x^2 + 2x + 5) + c$$

$$(17) -\frac{1}{2}e^{3-2x} + c$$

$$(22) -\sin\left(\frac{1}{x}\right) + C$$

$$(27) \frac{1}{3} \arctan(x^3) + c$$

$$(31) \frac{1}{2} \arcsin(x^2) + c$$

$$(37) \frac{12}{5}$$

§6.2

$$(1) x \sin(x) + \cos(x) + c$$

$$(3) \frac{1}{2}xe^{2x} - \frac{1}{4}e^{2x} + c$$

$$(5) \frac{1}{3}x^3 \ln(x) - \frac{1}{9}x^3 + c$$

$$(7) -\frac{1}{3}x^2e^{-3x} - \frac{2}{9}xe^{-3x} - \frac{2}{27}e^{-3x} + c$$

$$(9) \frac{1}{17}e^x \sin(4x) - \frac{4}{17}e^x \cos(4x) + c$$

$$(14) x(\ln(x))^2 - 2x \ln(x) + 2x + c$$

$$(19) -\frac{1}{2} \cos(2) + \frac{1}{4} \sin(2)$$

$$(41) x \arccos(x) - \sqrt{1-x^2} + c$$

$$(42) x \arctan(x) - \frac{1}{2} \ln(1+x^2) + c$$

$$(44) 2\sqrt{x}e^{\sqrt{x}} - 2e^{\sqrt{x}} + c$$

Kwartiel 1, Week 7.2

§6.4

$$(1) \int \frac{x-5}{x^2-1} dx = \int \left(\frac{3}{x+1} - \frac{2}{x-1} \right) dx = 3 \ln |x+1| - 2 \ln |x-1| + c$$

$$(3) \int \frac{6x}{x^2-x-2} dx = \int \left(\frac{4}{x-2} + \frac{2}{x+1} \right) dx = 4 \ln |x-2| + 2 \ln |x+1| + c$$

$$(5) \int \frac{-x+5}{x^3-x^2-2x} dx = \int \left(\frac{-5}{2x} + \frac{1}{2(x-2)} + \frac{2}{x+1} \right) dx = -\frac{5}{2} \ln |x| + \frac{1}{2} \ln |x-2| + 2 \ln |x+1| + c$$

$$(10) \int \frac{4x-5}{x^3-3x^2} dx = \int \left(\frac{-7}{9x} + \frac{5}{3x^2} + \frac{7}{9(x-3)} \right) dx = -\frac{7}{9} \ln |x| - \frac{5}{3x} + \frac{7}{9} \ln |x-3| + c$$

$$(11) \int \frac{x+2}{x^3+x} dx = \int \left(\frac{2}{x} + \frac{-2x+1}{x^2+1} \right) dx = 2 \ln |x| - \ln(x^2+1) + \arctan(x) + c$$

$$(21) \int \frac{x^3+x+2}{x^2+2x-8} dx = \int \left(x-2 + \frac{11}{x+4} + \frac{2}{x-2} \right) dx = \frac{1}{2}x^2 - 2x + 11 \ln |x+4| + 2 \ln |x-2| + c$$

$$(23) \int \frac{x+4}{x^3+3x^2+2x} dx = \int \left(\frac{2}{x} + \frac{1}{x+2} - \frac{3}{x+1} \right) dx = 2 \ln |x| + \ln |x+2| - 3 \ln |x+1| + c$$

$$(31) \int \frac{4x^2+3}{x^3+x^2+x} dx = \int \left(\frac{3}{x} + \frac{x-3}{x^2+x+1} \right) dx = 3 \ln |x| + \frac{1}{2} \ln(x^2+x+1) - \frac{7}{\sqrt{3}} \arctan \left(\frac{2x+1}{\sqrt{3}} \right) + c$$

§Aanvulling zwaartepunt

$$(1) \bar{x} = \frac{1}{2}\pi, \bar{y} = \frac{1}{8}\pi$$

$$(2) \bar{x} = 0, \bar{y} = \frac{4}{5}$$

$$(3) \bar{x} = 0, \bar{y} = \frac{4R}{3\pi}$$

$$(4) \bar{x} = \frac{9}{20}, \bar{y} = \frac{9}{20}$$