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WISKUNDE
Graad 12



EKSAMEN V1
September 2014
Totaal: 150

MEMO

VRAESTEL 1

VRAAG 1

1.1.1	$x^2 + 11x = -24$ $\therefore x^2 + 11x + 24 = 0$ $\therefore (x+8)(x+3) = 0$ $\therefore x = -8 / -3$	✓ standaardvorm ✓ faktore ✓ beide antwoorde	(3)
1.1.2	$6^{3x-1} = 1$ $\therefore 6^{3x-1} = 6^0$ $\therefore 3x-1 = 0$ $\therefore 3x = 1$ $\therefore x = \frac{1}{3}$	✓ 6^0 ✓ vergelyking ✓ antwoord	(3)
1.1.3	$\sqrt{7x+2} + 2x = 0$ $\therefore \sqrt{7x+2} = -2x$ $\therefore 7x+2 = 4x^2$ $\therefore 4x^2 - 7x - 2 = 0$ $\therefore (4x+1)(x-2) = 0$ $\therefore x = 2 / -\frac{1}{4}$	✓ beide kante kwardreer ✓ standaardvorm ✓ faktore ✓ beide antwoorde ✓ $x \neq 2$	(5)
1.2	$\sqrt{x(x+4)} + 3 \geq 0$ $\therefore x^2 + 4x + 3 \geq 0$ $\therefore (x+3)(x+1) \geq 0$ $\therefore x = -1 / -3$ $\therefore -3 \leq x \leq -1$	✓ standaardvorm ≥ 0 ✓ faktore ✓ -1/-3 ✓✓ ongelykheid	(5)
1.3	$4y + 3x = 50$ $x^2 + y^2 = 100$ $\therefore y = \frac{3}{4}x + \frac{50}{4}$		(7)

1.4	$\left(\sqrt{\sqrt{13}+2}\right)\left(\sqrt{\sqrt{13}-2}\right)$ $= \left(\sqrt{(\sqrt{13}+2)(\sqrt{13}-2)}\right)$ $= \sqrt{13-4}$ $= \sqrt{9}$ $= 3$	✓ enkele produk ✓ $\sqrt{9}$ ✓ 3	(3)
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VRAAG 2

2.1.1	$a = -10$ $d = 7$ $T_{50} = -10 + (50-1)(7)$ $= 333$	✓ subst ✓ antwoord	(2)
2.1.2	$S_n = \frac{n}{2}[2(-10) + (n-1)(7)] = 3152$ $\therefore \frac{n}{2}[-27 + 7n] = 3152$ $\therefore -27n + 7n^2 = 6304$ $\therefore 7n^2 - 27n - 6304 = 0$ $\therefore (7n-)(n-)=0$	✓ subst in formule ✓ standaardvorm ✓ faktore ✓ antwoord	(4)
2.2.1	$T_2 = ar = 24$ $T_8 = ar^7 = 0,375$ $r = \frac{ar^7}{ar} = \frac{0.375}{24}$ $\therefore r^6 = \frac{0.375}{24}$ $\therefore r = \sqrt[6]{\frac{0.375}{24}}$ $\therefore r = 2$	✓ T_2 ✓ T_8 ✓ subst ✓ vereenvoudig ✓ antwoord	(5)
2.2.2	$S_\infty = \frac{a}{1-r}$ $= \frac{48}{1-2}$ $= -48$		(3)

2.3	$r = 3x - 4$ $-1 < r < 1$ $\therefore -1 < 3x - 4 < 1$ $\therefore 3 < 3x < 5$ $\therefore 1 < x < \frac{5}{3}$	✓ ongelykheid ✓✓ antwoord	(3)
2.4	$\sum_{k=1}^n 4 \cdot 3^{n-1} = 2186$ 2;6;18 $r = 3$ $S_n = \frac{a(r^n - 1)}{r - 1} = 2186$ $\therefore \frac{2(3^n - 1)}{3 - 1} = 2186$ $\therefore 3^n = 2187$ $\therefore n = 7$		(5)

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VRAAG 3

3.1.1	$x - 5 - 3 = 4$ $\therefore x = 12$		
3.1.2			

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VRAAG 4

4.1.1	$A = P(1+i)^n$ $= 500560(1+0.07)^4$ $= 374444,91$	✓ formule ✓ subst ✓ antwoord	(3)
4.1.2	$A = P(1-i)^n$ $= 500560(1-0.09)^4$ $= 706581,29$	✓ formule ✓ subst ✓ antwoord	(3)
4.1.3	$706581,29 - 374444,91 + 50000$ $= 382136,38$	✓ subst ✓ +50 000 ✓ antwoord	(3)

4.1.4	$F_v = \frac{x[(1+i)^n - 1]}{i}$ $382136,28 = \frac{x[(1 + \frac{0.09}{12})^{49} - 1]}{\frac{0.09}{12}}$ $\therefore x = 6482,15$	✓ formule ✓ subst ✓ antwoord	(3)
4.2	$3x = x\left(1 + \frac{0.11}{12}\right)^{12n}$ $\therefore 3 = \left(1 + \frac{0.11}{12}\right)^{12n}$ $\therefore \log 3 = \log\left(1 + \frac{0.11}{12}\right)^{12n}$ $\therefore \log 3 = 12n \log\left(1 + \frac{0.11}{12}\right)$ $\therefore \frac{\log 3}{\log\left(1 + \frac{0.11}{12}\right)} = 12n$ $\therefore n = 10,33$	✓ formule en subst ✓ logs beide kante ✓ antwoord	(3)

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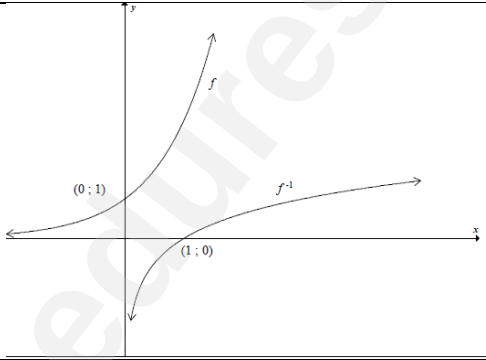
VRAAG 5

5.1	$x = 1$ $y = 3$	✓ ✓	(2)
5.2	$0 = -\frac{4}{x-1} + 3$ $\therefore -3 = -\frac{4}{x-1}$ $\therefore -3(x-1) = -4$ $\therefore -3x + 3 = -4$ $\therefore -3x = -7$ $\therefore x = \frac{7}{3} \left(\frac{7}{3}; 0\right)$ $y = -\frac{4}{0-1} + 3$ $\therefore y = 7 \quad (0; 7)$	✓ $y = 0$ ✓ antwoord ✓ $x = 0$ ✓ antwoord	(4)

5.3		✓✓✓✓	
5.4	$\frac{f(6) - f(4)}{6 - 4}$ $= \frac{\frac{11}{5} - \frac{5}{3}}{2}$ $= \frac{4}{15}$	✓ formule ✓ subst ✓ antwoord	(4)
5.5	$1 < x \leq \frac{7}{3}$	✓✓ ongelykheid	(2)

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6.1	$y = 3^x$ $x = 3^y$ $\therefore \log x = y \log 3$ $\therefore y = \log_3 x$	✓	(1)
6.2		f(x) ✓ vorm ✓ x afsnit f ⁻¹ (x) ✓ vorm ✓ x afsnit	(4)
6.3	$0 < x \leq 1$	✓✓	(2)

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VRAAG 7

7.1	$\frac{x}{2} - \frac{7}{2} = 0$ $\therefore x = 7$ $C(7;0)$	✓✓	(2)
7.2	$3 - 4$ $= -1$	✓✓	(2)
7.3	OPSIE 1 $f(x) = a(x-3)^2 + q$ By B en C: $0 = 16a + q$ By E: $-\frac{7}{2} = 9a + q$ Gelyktydige oplossing gee $a = \frac{1}{2} \text{ en } q = -8$ OPSIE 2 $f(x) = a(x+1)(x-7)$ $y = a(x+1)(x-7)$ $-3,5 = a(0+1)(0-7)$ $-3,5 = -7a$ $a = \frac{1}{2}$ $f(x) = \frac{1}{2}(x+1)(x-7)$ $= \frac{1}{2}(x^2 - 6x - 7)$ $= \frac{1}{2}[(x-3)^2 - 16]$ $= \frac{1}{2}(x-3)^2 - 8$	✓✓✓✓✓✓	(6)
7.4	$h(x) = -f(x)$ $= -\frac{1}{2}(x-3)^2 + 8$	✓	(1)

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VRAAG 8			
8.1	$f(x) = 2x^3$ $= \lim_{h \rightarrow 0} \frac{2(x+h)^3 - (2x^3)}{h}$ $= \lim_{h \rightarrow 0} \frac{2(x^3 + 3x^2h + 3xh^2 + h^3) - 2x^3}{h}$ $= \lim_{h \rightarrow 0} \frac{2x^3 + 6x^2h + 6xh^2 + 2h^3 - 2x^3}{h}$ $= \lim_{h \rightarrow 0} \frac{6x^2h + 6xh^2 + 2h^3}{h}$ $= \lim_{h \rightarrow 0} (6x^2 + 6xh + 2h^2)$ $f'(x) = 6x^2 + 6x(0) + 2(0)^2$ $= 6x^2$	✓ subst ✓ vereenvoudig ✓ faktorisering ✓ $h = 0$ ✓ antwoord	(5)
8.2.1	$y = \frac{x^2 - 5x + 6}{x - 3}$ $= \frac{(x-3)(x-2)}{(x-3)}$ $= x - 2$ $y' = 1$		(3)
8.2.2	$D_x \left[\frac{4}{\sqrt{x}} - \frac{x^3}{9} \right]$ $= 4x^{-\frac{1}{2}} - \frac{1}{9}x^3$ $D_x = -\frac{1}{2} \left(4x^{-\frac{3}{2}} \right) - 3 \left(\frac{1}{9}x^2 \right)$ $= -2x^{-\frac{3}{2}} - \frac{1}{3}x^2$ $= \frac{-2}{\sqrt{x^3}} - \frac{x^2}{3}$		(4)

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VRAAG 9

9.1	$f(x) = (x-1)(x^2 - 4x - 12) = 0$ $= (x-1)(x-6)(x+2) = 0$ $A(-2;0)$ $B(1;0)$ $C(6;0)$	$\checkmark =0$ $\checkmark$ faktore $\checkmark$ A $\checkmark$ B $\checkmark$ C	(5)
9.2	$f'(x) = 3x^2 - 10x - 8 = 0$ $\therefore (3x+2)(x-4) = 0$ $\therefore x = 4 / -\frac{2}{3}$ $D(4;-36)$	$\checkmark$ afgeleide $=0$ $\checkmark$ faktore $\checkmark$ antwoorden $\checkmark$ D	(4)
9.3	$f''(x) = 6x - 10 = 0$ $\therefore 6x = 10$ $\therefore x = \frac{10}{6}$ $(1,67; -10; 59)$	$\checkmark\checkmark$ 2de afgeleide $=0$ $\checkmark$ antwoord $\checkmark$ koördinaat	(4)
9.4	$E(0;12)$ $f'(0) = -8$ $y = -8x + 12$	$\checkmark$ E $\checkmark$ subst $\checkmark$ antwoord	(3)

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VRAAG 10

10.1	$340ml = 340cm^3$ $Vol = \pi r^2$ $\therefore 340 = \pi x^2 \cdot h$ $\therefore h = \frac{340}{\pi x^2}$	$\checkmark$ formule, subst $\checkmark$ antwoord	(2)
10.2	$BO = \pi r^2 + \pi r^2 + \pi Dh$ $= 2\pi r x^2 + \pi 2x \cdot \frac{340}{\pi x^2}$ $= 2\pi x^2 + \frac{680}{x}$	$\checkmark$ formule $\checkmark$ subst $\checkmark$ antwoord	(3)

10.3	$A = 2\pi x^2 + 680x^{-1}$ $A' = 4\pi x - 680x^{-2}$ $= 4\pi x - \frac{680}{x^2}$ $A' = 4\pi x - \frac{680}{x^2} = 0$ $\therefore 4\pi x = \frac{680}{x^2}$ $\therefore 4\pi x^3 = 680$ $\therefore x^3 = \frac{680}{4\pi}$ $\therefore x = \sqrt[3]{\frac{680}{4\pi}}$ $\therefore x = 3,782$	✓ afgeleide ✓ =0 ✓ x^3 ✓ antwoord	(4)
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[9]

VRAAG 11

11.1	$P(A \text{ or } B) = P(A) + P(B)$ $\therefore 0,57 = P(A) + P(B)$ $\therefore 0,57 = P(A) + 2P(A)$ $\therefore 0,57 = 3P(A)$ $\therefore P(A) = 0,19$ $P(B) = 2(0,19)$ $= 0,38$		(3)
11.2.1	$\frac{9!}{2! \times 3! \times 2!} = 15120$		(3)
11.2.2	$\frac{7!}{2! \times 3!} = 420$		(3)
11.2.3	$\frac{420}{15120} = 0,028$		(2)

[11]

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