

Memorandum

Gr. 10 Junie Vraestel 1

Vraag 1

$$1.1) \quad x = 0,421421\dots \quad (1)$$

$$1000x = 421,421\dots \quad (2) \checkmark$$

$$(2) - (1) : 999x \checkmark = 421 \checkmark$$

$$x = \frac{421}{999} \checkmark$$

(4)

$$1.2) \quad \sqrt{49} < \sqrt{63} < \sqrt{64} \checkmark$$

$$7 < \sqrt{63} < 8 \checkmark$$

(2)

$$1.3.1) \quad - (3c - a)^2$$

$$= - (9c^2 - 6ac + a^2) \checkmark$$

$$= -9c^2 \checkmark + 6ac \checkmark - a^2$$

(3)

$\checkmark ()^2$

$\checkmark -9c^2 - a^2$

$\checkmark +6ac$

$$1.3.2) \quad (2a - 3b)(4a^2 + 6ab + 9b^2)$$

$$= 8a^3 - 27b^3$$

(2)

$\checkmark 8a^3$

$\checkmark -27b^3$

$$1.3.3) \quad 8xy \left(\frac{x}{8} - \frac{y}{2} \right)$$

$$= x^2y \checkmark - 4xy^2 \checkmark$$

(2)

$\checkmark x^2y$

$\checkmark -4xy^2$

$$1.3.4) \frac{x^2}{(x^2-1)(x-1)} - \frac{1}{(1-x)}$$

$$\frac{x^2}{(x-1)^2(x+1)} + \frac{1}{(x-1)} \quad \begin{array}{l} \text{teken en noemer} \\ \text{moet veranderen} \end{array}$$

$$\frac{x^2 + (x^2-1)}{(x-1)^2(x+1)} \quad \checkmark \text{ KGV}$$

$$\frac{2x^2-1}{(x-1)^2(x+1)} \quad \checkmark \text{ antwoord.} \quad (3)$$

$$1.3.5) \frac{3 \cdot 2^a - 4 \cdot 2^{a-2}}{2^a - 2^{a-1}}$$

$$= \frac{2^a (3 - 4 \cdot 2^{-2})}{2^a (1 - 2^{-1})} \quad \begin{array}{l} \text{Faktoriiseer} \\ \text{Faktoriiseer.} \end{array}$$

$$= \frac{3 - 4 \times \frac{1}{4}}{1 - \frac{1}{2}} \quad \checkmark$$

$$= \frac{2}{\frac{1}{2}}$$

$$= 4 \quad \checkmark \quad (4)$$

1.3.6) $6^x = 5$
 $(2 \cdot 3)^x = 5$ ✓

$$\frac{18^x}{2^{-x}}$$

$$= \frac{(2 \cdot 3^2)^x}{2^{-x}}$$

$$= 2^{x+x} \cdot 3^{2x}$$

$$= (2^2 \cdot 3^2)^x$$

of

$$(2 \cdot 3)^{2x}$$

$$= (5)^2$$

$$= 25$$

(3) ✓

1.4.1) $\frac{8x^2}{y^2 - 2}$

$$= 2 \left(\frac{4x^2}{y^2} - 1 \right)$$

$$= 2 \left(\frac{2x}{y} - 1 \right) \left(\frac{2x}{y} + 1 \right)$$

✓ Gemene Faktor
 (2) ✓ verstuik in kwadrante

1.4.2) $8x^2 - 4x - 12$

$$= 4(2x^2 - x - 3)$$

$$= 4(2x - 3)(x + 1)$$

✓ Gemene Faktor
 (3) ✓ ()
 ✓ ()

1.4.3) $4ab - 2a + 2a^2b - 4$

$$= 4ab + 2a^2b - 4 - 2a$$

$$= 2ab(2 + a) - 2(2 + a)$$

$$= 2(2 + a)(ab - 1)$$

(3)

Grøpepeer + Gemene faktor.

Vraag 2

$$\begin{aligned} 2.1) \quad x^2 &= 10x \\ x^2 - 10x &= 0 \quad \checkmark \\ x(x - 10) &= 0 \quad \checkmark \\ x = 0 &\quad \text{of} \quad x = 10 \quad \checkmark \quad (3) \end{aligned}$$

$$\begin{aligned} 2.2) \quad \frac{2x}{1-2x} &= \frac{3x+2}{2x-1} - 2 \\ \text{X KGV } (2x-1) : \quad -2x &= 3x+2 - 2(2x-1) \\ -2x &= 3x+2 - 4x+2 \quad \checkmark \\ -x &= 4 \\ x &= -4 \quad \checkmark \quad (4) \end{aligned}$$

$$\begin{aligned} 2.3) \quad 3^{x+2} - 3^x - 216 &= 0 \\ 3^{x+2} - 3^x &= 216 \quad \checkmark \\ 3^x (3^2 - 1) &= 216 \\ 3^x (8) &= 216 \quad \checkmark \\ 3^x &= \frac{216}{8} \\ 3^x &= 27 \quad \checkmark \quad \text{of } 3^3 \\ x &= 3 \quad \checkmark \quad (4) \end{aligned}$$

$$\begin{aligned} 2.4) \quad 2 - 2x &< 10 \\ -2x &< 8 \quad \checkmark \\ x &> -4 \quad \checkmark \quad (2) \end{aligned}$$

$$2.5) \quad -15 \leq -2x + 3 \leq 13$$

$$-18 \leq -2x \leq 10 \quad \checkmark$$

$$9 \geq x \geq -5 \quad \checkmark \quad (2)$$

$$2.6) \quad R = 2 \sqrt[3]{xK}$$

$$\frac{R}{2} \checkmark = \sqrt[3]{xK}$$

$$\left(\frac{R}{2}\right)^3 \checkmark = xK$$

$$\frac{\left(\frac{R}{2}\right)^3 \checkmark}{K} \checkmark = x \quad (3)$$

$$2.7) \quad 14b = -2a + 30 \quad (1)$$

$$(1) \div 2: 7b = -a + 15 \quad \checkmark$$

$$2b - 3 - a = 0 \quad (2)$$

$$2b = a + 3 \quad \checkmark$$

$$(1) + (2): 9b = 18 \quad \checkmark$$

$$b = 2$$

Stel $b = 2$ in (2)

$$2(2) \checkmark = a + 3$$

$$4 = a + 3 \quad \checkmark$$

$$\therefore b = 2 \text{ en } a = 1 \quad (5)$$

$\checkmark (1) \div 2$

verander
 \checkmark vergelyk

$\checkmark b = 2$

\checkmark instel
 $\checkmark a = 1$

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Vraag 3

3.1.1) $f(x) = -2x^2 + 4$

x-afsnit (stel $y=0$)

$$0 = -2x^2 + 4$$

$$0 = -2(x^2 - 2)$$

$$\div (-2): 0 = (x^2 - 2)$$

$$2 = x^2$$

$$\pm\sqrt{2} = x$$

$$\pm 1,41 = x$$

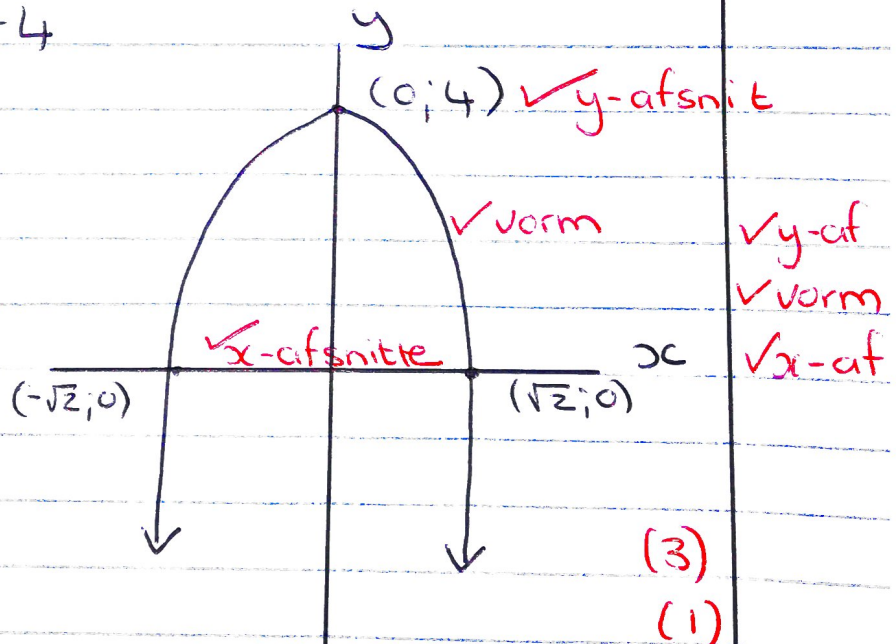
$\therefore (1,41; 0)$ en $(-1,41; 0)$

y-afsnit (stel $x=0$)

$$y = -2(0)^2 + 4$$

$$y = 4$$

$\therefore (0; 4)$



3.1.2) DV: $x \in \mathbb{R}$ ✓ of
 $x \in (-\infty; \infty)$

3.1.3) NV: $y \in (-\infty; 4]$ ✓

(1)

3.1.4) Refleksie in die y-as en 3 eenhede af:

$$f(-x) - 3 = h(x)$$

$$h(x) = -2(-x)^2 + 4 - 3$$

$$h(x) = -2x^2 + 1$$

(2)

✓ $-2x^2$

✓ $+1$

3.2)

3.2.1) $y = a(x - w_1)(x - w_2)$

$$y = a(x + 2)(x - 2) \quad \checkmark \text{ instel } x\text{-afsnitte}$$

$$y = a(x^2 - 4)$$

Stel in $(0; 8)$

$$8 = a(0^2 - 4) \quad \checkmark \text{ instel van } \bar{n} \text{ punt}$$

$$8 = -4a$$

$$-2 = a \quad \checkmark$$

$$\therefore y = -2(x^2 - 4)$$

$$\therefore y = -2x^2 + 8 \quad \checkmark$$

(4)

3.2.2)

$$y = ax^2 + q$$

$$y = ax^2 - 1 \quad \checkmark \quad q = -1$$

Stel in $(1; 1)$

$$1 = a(1)^2 - 1 \quad \checkmark \text{ stel } \bar{n} \text{ punt in}$$

$$2 = a \quad \checkmark$$

$$\therefore y = 2x^2 - 1$$

(3)

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Vraag 4

4.1.1) A en B is die x-afsnitte van $f(x)$

∴ Stel $y=0$

$$0 = 9 - x^2$$

$$(x-1) 0 = x^2 - 9 \quad \checkmark$$

$$0 = (x+3)(x-3) \quad \checkmark$$

$$\therefore x = -3 \quad \text{en} \quad x = 3$$

$$A (-3; 0) \quad \checkmark$$

$$B (3; 0) \quad \checkmark$$

(3)

4.1.2) D is die snypunt van $f(x)$ en $g(x)$:

$$2x+6 = 9-x^2$$

$$x^2 + 2x - 3 = 0 \quad \checkmark$$

$$(x+3)(x-1) = 0$$

$$\therefore x = -3 \quad \text{en} \quad x = 1$$

D se x-koordinaat is 1 \checkmark

Stel nou $x=1$ in $g(x)$

$$y = 2(1) + 6 \quad \checkmark$$

$$y = 8$$

(4)

$$\therefore D (1; 8)$$

4.1.3) E is \bar{n} punt op $f(x)$ met \bar{n} x -kooördinaat van -1 :

$$\begin{aligned} f(-1) &= 9 - (-1)^2 \quad \checkmark \text{ instel} \\ &= 9 - 1 \\ &= 8 \quad \checkmark \end{aligned}$$

(2)

$\therefore \Sigma (-1; 8)$
 \therefore Afstand tussen Σ en F is 8 eenhede.

4.1.4.1) $f(x) \leq g(x)$

$$x \in (-\infty; -3] \vee x \in [1; \infty) \quad \checkmark \quad (2)$$

4.1.4.2) $f(x) > 0$

$$x \in (-\sqrt{3}; \sqrt{3}) \quad \checkmark \quad (2)$$

[13]

Vraag 5

5.1.1) $f(0) = 2$ \checkmark ; Dit dui die y -afsnit van die funksie aan want $x=0$. \checkmark (2)

5.1.2) $f(x) = ax^2 + q$ \checkmark

$$\dot{y} = ax^2 + 2 \quad \checkmark$$

(1; 3)

$$3 = a + 2 \quad \checkmark \quad \text{Stel } \bar{n} \text{ punt in}$$

$$1 = a \quad \checkmark$$

$$\therefore f(x) = x^2 + 2$$

(3)

los op vir x:

$$5.1.3) f\left(\frac{1}{2}x\right) = f(x) - 3$$

$$\left(\frac{1}{2}x\right)^2 + 2 = x^2 + 2 - 3$$
$$\frac{1}{4}x^2 - x^2 = -3$$

$$-\frac{3}{4}x^2 = -3$$

$$x^2 = \frac{-3}{1} \times \frac{-4}{3}$$

$$x^2 = 4$$

$$x = \pm \sqrt{4}$$

$$x = \pm 2$$

(4)

[9]

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