Taak irrationale functies

Virga-Jessecollege **Toets WISKUNDE**
Hasselt **leerkracht: Karel Appeltans**
Datum: **schooljaar 20…-20…**
Klas: **Afdeling:**
Naam:..... **Aantal uren wiskunde: 6**

1	Find the domain of the function $f(x) = \dfrac{x - \sqrt{64 - x^2}}{2x^2 + 12 + 10x}$, bepaal tevens np en tt
2	De functie $f : \mathbb{R} \to \mathbb{R}$ heeft als voorschrift $f(x) = x^3$ en de functie $g : \mathbb{R}^+ \to \mathbb{R}^+$ heeft als voorschrift $g(x) = \sqrt{x}$. Verder definiëren we de functies $k : \mathbb{R}^+ \to \mathbb{R}^+$ door $k(x) = f(g(x))$ en $\ell : \mathbb{R}^+ \to \mathbb{R}^+$ door $\ell(x) = g(2 \cdot k(x))$. Waaraan is $\ell(4)$ gelijk? (A) 1 (B) 2 (C) 3 (D) 4
3	Bepaal de inverse $f^{-1}(x)$ van de gegeven functies (in het gegeven domein) $f(x) = \sqrt{2x + 1}$
4	Bepaal de inverse $f^{-1}(x)$ van de gegeven functies (in het gegeven domein) $f(x) = 9 + \sqrt{4x - 4}$
5	2. (8 pts.) f(x) = $\sqrt{\dfrac{2}{x^2 - 1}}$ and g(x) = $\sqrt{x^2 - 1}$. (a) Find the domain of f and express it in interval notation. (b) Find and simplify the composition f(g(x)).
6	Bepaal de inverse $f^{-1}(x)$ van de gegeven functies (in het gegeven domein) $f(x) = \dfrac{x+3}{x+7}$
7	Let $f(x) = \dfrac{7 - \sqrt{x^2 - 9}}{\sqrt{25 - x^2}}$. Then dom f = (____ , ____] ∪ [____ , ____). Toon alle berekeningen

8

If $f(x) = \sqrt{x}$ and $g(x) = \frac{1}{x-1}$, find the functions $f \circ g$ and $g \circ f$ and their domains.

$(f \circ g)(x) =$

domain :

$(g \circ f)(x) =$

domain :

9

If $f(x) = \sqrt{x}$ and $g(x) = \sqrt{27 - x^3}$, the domain of $g \circ f$ is

A. $[0, 9]$

B. $(-\infty, 9]$

C. $(-\infty, 0] \cup [9, \infty)$

D. $[0, \infty)$

E. $[0, 3]$

10

The function f is defined by

$$f(x) = 12 - 4x - x^2, \; x \in (-\infty, \alpha).$$

It is given that f is one-one.

(i) Determine the largest possible value of α.

(ii) Obtain an expression for $f^{-1}(x)$. (f^{-1} denotes the inverse of f)

11

Herschrijf naar de meest eenvoudige vorm:

$$\frac{\sqrt{a^{\frac{2}{3}} \cdot b^{\frac{5}{2}}}}{b^{\frac{1}{4}}}$$

$$\left(\frac{a^{-\frac{2}{3}} b^{\frac{1}{2}}}{ab^{-1}}\right)^2 : \sqrt[3]{\frac{a^{-1}}{b^{-3}}}$$

12	. If $f(x) = \frac{1}{x+7}$ and $g(x) = x^3 - 8$ find the composite functions $f \circ g$ and $g \circ f$ and give their domains. $(f \circ g)(x) =$ Domain of $(f \circ g)$ $(g \circ f)(x) =$ Domain of $(g \circ f)$
13	$f(x) = x^2 + 2x$. Is f inverteerbaar? Zo ja bepaal de inverse. Zo neen geef een zinvolle inperking van het domein en bepaal vervolgens de inverse op dit beperkt domein
14	**5.** Find a formula for the inverse of the function $$f(x) = \frac{6x-1}{2x+1}.$$ A. $f^{-1}(x) = \frac{-x-1}{2x-6}$ B. $f^{-1}(x) = \frac{-y-1}{2y-6}$ C. $f^{-1}(x) = \frac{2x+1}{6x-1}$ D. $f^{-1}(x) = \frac{x+1}{2x-6}$ E. $f^{-1}(x) = \frac{6x-1}{2x+1}$
15	Beschouw de reële functies f en g met volgende functievoorschriften: $f(x) = \frac{2x}{x-1}$ en $g(x) = \frac{x}{1-x}$ Wat is het domein D van de samenstelling $(f \circ g)$? (A) $D = \mathbb{R} \setminus \{\frac{1}{2}\}$ (B) $D = \mathbb{R} \setminus \{1\}$ (C) $D = \mathbb{R} \setminus \{-1, 1\}$ (D) $D = \mathbb{R} \setminus \{1, \frac{1}{2}\}$
16	4. Let $f(x) = \sqrt{x+2} - 2$. Then $f^{-1}(2) =$ A. 14 B. 18 C. 10 D. 6 E. 2

17

3. Find a formula for the inverse of the function

$$f(x) = \frac{4x-2}{2x+5}.$$

A. $f^{-1}(x) = \frac{2x+5}{4x-2}$

B. $f^{-1}(x) = \frac{4x-2}{x-5}$

C. $f^{-1}(x) = \frac{-5x+1}{2x-1}$

D. $f^{-1}(x) = \frac{-x-5}{x-2}$

E. $f^{-1}(x) = -\frac{5x+2}{2x-4}$

18

6. Find a formula for the inverse of the function

$$f(x) = \frac{2x-1}{x+3}.$$

A. $f^{-1}(x) = \frac{3x-1}{x+2}$

B. $f^{-1}(x) = \frac{3x-1}{x-2}$

C. $f^{-1}(x) = \frac{-3x+1}{x-2}$

D. $f^{-1}(x) = \frac{-3x-1}{x-2}$

E. $f^{-1}(x) = \frac{-3x-1}{x+2}$

19

Answer Problem 1 on Answer Sheet 1.

For this problem, let $f(x) = \frac{(x-1)^2}{4} - 5, g(x) = 1 - 2\sqrt{x+5}$.

(3 pts.) a. Write the domain of $g(x)$ in interval form.

(9 pts.) b. Describe a series of transformations that will take the graph of $y = \sqrt{x}$ into the graph of $g(x)$. After each transformation, list the equation of the new function as you go. Do not graph the functions.

(6pts.) c. Compute the composition function $K(x) = (g \circ f)(x)$.

(5pts.) d. Determine whether $f(x)$ and $g(x)$ are inverse functions or not when $x \geq 1$. Justify your answer. **Hint**: Use 1c.

20

For this problem, let $f(x) = \frac{(x-5)^2}{4} - 1, g(x) = 5 - 2\sqrt{x-1}$.

a. Describe a series of transformations that will take the graph of $y = x^2$ into the graph of $f(x)$. For each transformation, list the new function as you go. [9 pts]

b. Write the domain of $g(x)$ in interval form. [3 pts]

c. Compute the composition function $K(x) = (f \circ g)(x)$ and find its domain. [10 pts]

d. Determine whether $f(x)$ and $g(x)$ are inverse functions or not. **Hint**: You could use 1c. [3 pts]

21

. a. Find $f^{-1}(x)$ if $f(x) = 5 + 17/x$. How would you prove that your function is the inverse of f? (You do not have to carry out the proof.)

22	Let $f(x) = 2 - \sqrt{x^2 - 9}$ and $g(y) = \sqrt{(2-y)^2 + 9}$ i. Find the domain of f and write it in interval notation. ii. Find $(g \circ f)(-5)$. iii. Pat claims that g is the inverse of f. Is Pat correct? Support your answer.
23	Let $f(x) = \frac{3-x}{x}$ and $g(x) = \frac{3}{x+2}$. These are the functions referred to in (i) and (ii). i. Find $(f \circ g)(x)$. (Don't forget to simplify your answer.) ii. Is g the inverse of f? Justify your answer.
24	Vereenvoudig en schrijf het resultaat zonder negatieve of gebroken exponenten en zonder wortel in de noemer (a, b en c stellen positieve getallen voor) $\sqrt[4]{\frac{a^{-7}(a^2b^3c^4)^2}{(abc^{10})^3(b^3c^{19})^{-2}}}$
25	**Oefening 4** Beschouw de functies $f : \mathbb{R}\backslash\{1\} \to \mathbb{R}\backslash\{-1\}$ met voorschrift $f(x) = \frac{1+x}{1-x}$ en $g : \mathbb{R}\backslash\{-1\} \to \mathbb{R}\backslash\{-1\}$ met voorschrift $g(x) = \frac{1-x}{1+x}$. Waaraan is $f(g(5))$ gelijk? (A) -5 (B) $-\frac{3}{2}$ (C) $-\frac{2}{3}$ (D) $\frac{1}{5}$
26	Let $g(x) = 3 + \sqrt{3x - 5}$. Use this function in answering parts (i) and (ii). i. Find the domain and range of g (in interval form). Label your answers clearly. ii. Find $g^{-1}(x)$.