



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NASIENRIGLYN

NATIONALE SERTIFIKAAT

WISKUNDE N2

1 April 2021

Hierdie nasienriglyn bestaan uit 7 bladsye.

VRAAG 1

1.1 WAAR (1)

1.2 1.2.1
$$\begin{aligned} & \frac{\log_e 1 - \log_4 16}{\log_4 2 - \log_4 32} \\ &= \frac{\log_e e^0 - \log_4 16}{\log_4 \frac{2}{32}} \checkmark \\ &= \frac{-\log_4 16}{\log_4 \frac{1}{16}} \checkmark \\ &= \frac{-\log_4 4^2}{\log_4 4^{-2}} \checkmark \\ &= 1 \checkmark \end{aligned} \quad (4)$$

1.2.2
$$\begin{aligned} & \frac{\sqrt[3]{\sqrt[4]{x^{24}y^{12}}}}{\sqrt[3]{x^3y^6} \times \sqrt{x^4y^4}} \\ &= \frac{(x^{24}y^{12})^{\frac{1}{3} \times \frac{1}{4}}}{xy^2 \times x^2y^2} \checkmark \\ &= \frac{x^2y}{x^3y^4} \checkmark \\ &= x^{2-3}y^{1-4} \\ &= \frac{1}{xy^3} \checkmark \end{aligned} \quad (3)$$

1.3
$$\begin{aligned} x &= \frac{\sqrt[4]{265} \times (0,32)^2}{14,3} \\ \log x &= \log \left[\frac{\sqrt[4]{265} \times (0,32)^2}{14,3} \right] \checkmark \\ \log x &= \frac{1}{4} \log 265 + 2 \log 0,32 - \log 14,3 \checkmark \\ \log x &= -1,5392 \quad \checkmark \\ x &= 10^{-1,5392} \\ x &= 0,0289 \quad \checkmark \end{aligned} \quad (4)$$

1.4
$$\begin{aligned} 1 &= \frac{128}{32^{2x+1}} \\ 2^{5(2x+1)} &= 2^7 \checkmark \\ 10x + 5 &= 7 \quad \checkmark \\ x &= \frac{1}{5} \checkmark \end{aligned} \quad (3)$$

[15]

VRAAG 2

$$\begin{aligned}
 2.1 \quad 2.1.1 \quad & \frac{7}{x^2 - 2xy + y^2} \times \frac{2x^2 - 2y^2}{x^2 + 2xy + y^2} \div \frac{2x + 2y}{x - y} \\
 &= \frac{7}{(x - y)^2} \checkmark \times \frac{2(x - y)(x + y) \checkmark}{(x + y)^2 \checkmark} \times \frac{x - y}{2(x + y)} \checkmark \\
 &= \frac{7}{(x + y)^2} \checkmark
 \end{aligned} \tag{5}$$

$$\begin{aligned}
 2.1.2 \quad & \frac{3}{4x^2 - 9} - \frac{5}{4x^2 - 12x + 9} \\
 &= \frac{3}{(2x - 3)(2x + 3) \checkmark} - \frac{5}{(2x - 3)^2 \checkmark} \\
 &= \frac{3(2x - 3) - 5(2x + 3)}{(2x + 3)(2x - 3)^2} \checkmark \\
 &= \frac{6x - 9 - 10x - 15}{(2x + 3)(2x - 3)^2} \checkmark \\
 &= \frac{-4(x + 6)}{(2x + 3)(2x - 3)^2} \checkmark
 \end{aligned} \tag{5}$$

$$\begin{aligned}
 2.2 \quad 2.2.1 \quad & m^2 - m - 12 = (m + 3)(m - 4) \checkmark \checkmark \\
 & m^2 - 7m + 12 = (m - 4)(m - 3) \checkmark \checkmark \\
 & 48 - 3m^2 = -3(m^2 - 16) \checkmark \\
 & \quad \quad \quad = -3(m - 4)(m + 4) \checkmark
 \end{aligned} \tag{6}$$

$$\begin{aligned}
 2.2.2 \quad & HCF = m - 4 \checkmark \\
 & \quad \quad \quad \checkmark \quad \quad \quad \checkmark \quad \quad \quad \checkmark \\
 & LCM = (m + 3)(m - 4)(m + 4)(m - 3)(-3)
 \end{aligned} \tag{4}$$

[20]

VRAAG 3

$$\begin{aligned}
 3.1 \quad & 7x^2 + 4x - 5 = 0 \\
 & x = \frac{-4 \pm \sqrt{16 - 4(7)(-5)}}{2(7)} \checkmark \\
 & x = \frac{-4 \pm \sqrt{156}}{14} \checkmark \\
 & x = 0.606 \checkmark \text{ or } x = -1.178 \checkmark
 \end{aligned} \tag{4}$$

$$\begin{aligned}
 3.2 \quad 3.2.1 \quad & n = \frac{Tpr}{u^2} \\
 & nu^2 = Tpr \checkmark \\
 & u^2 = \frac{Tpr}{n} \checkmark \\
 & u = \pm \sqrt{\frac{Tpr}{n}} \checkmark
 \end{aligned} \tag{3}$$

$$\begin{aligned}
 3.2.2 \quad & u = \pm \sqrt{\frac{55.5 \times 17.5 \times 3.55}{9.25}} \\
 & u = \pm 19.307 \checkmark
 \end{aligned} \tag{1}$$

$$\begin{aligned}
 3.3 \quad & 3b + 4a + 2 = 0 \text{ --- (1)} \\
 & 2a + 3b = 11 \text{ --- (2)} \\
 & a = \frac{11 - 3b}{2} \text{ --- (3)} \checkmark \\
 & (3) \text{ in } (1) \\
 & 3b + 4\left(\frac{11 - 3b}{2}\right) + 2 = 0 \checkmark \\
 & b = 8 \checkmark \\
 & a = -\frac{13}{2} \checkmark
 \end{aligned}$$

ALTERNATIEF 2

$$\begin{aligned}
 & 4a + 3b = -2 \dots\dots (1) \\
 & -[2a + 3b = 11] \dots\dots (2) \\
 & \hline
 & 2a = -13 \\
 & a = -\frac{13}{2}
 \end{aligned}$$

ALTERNATIEF 1

$$\begin{aligned}
 & \Rightarrow a = \frac{-2 - 3b}{4} \text{ --- (3)} \checkmark \\
 & (3) \text{ in } (2) \Rightarrow 2\left(\frac{-2 - 3b}{4}\right) + 3b = 11 \checkmark \\
 & b = 8 \checkmark \\
 & a = -\frac{13}{2} \checkmark
 \end{aligned}$$

Vervang a in (2)

$$\begin{aligned}
 & 2\left(-\frac{13}{2}\right) + 3b = 11 \\
 & -13 + 3b = 11 \\
 & \therefore b = 8
 \end{aligned}$$

$$\begin{aligned}
 3.4 \quad & \text{Laat } w = \text{prys van een waatlemoen} \\
 & \Rightarrow 400 - 4w = R16,60 \checkmark \\
 & \Rightarrow w = R95,85 \checkmark
 \end{aligned}$$

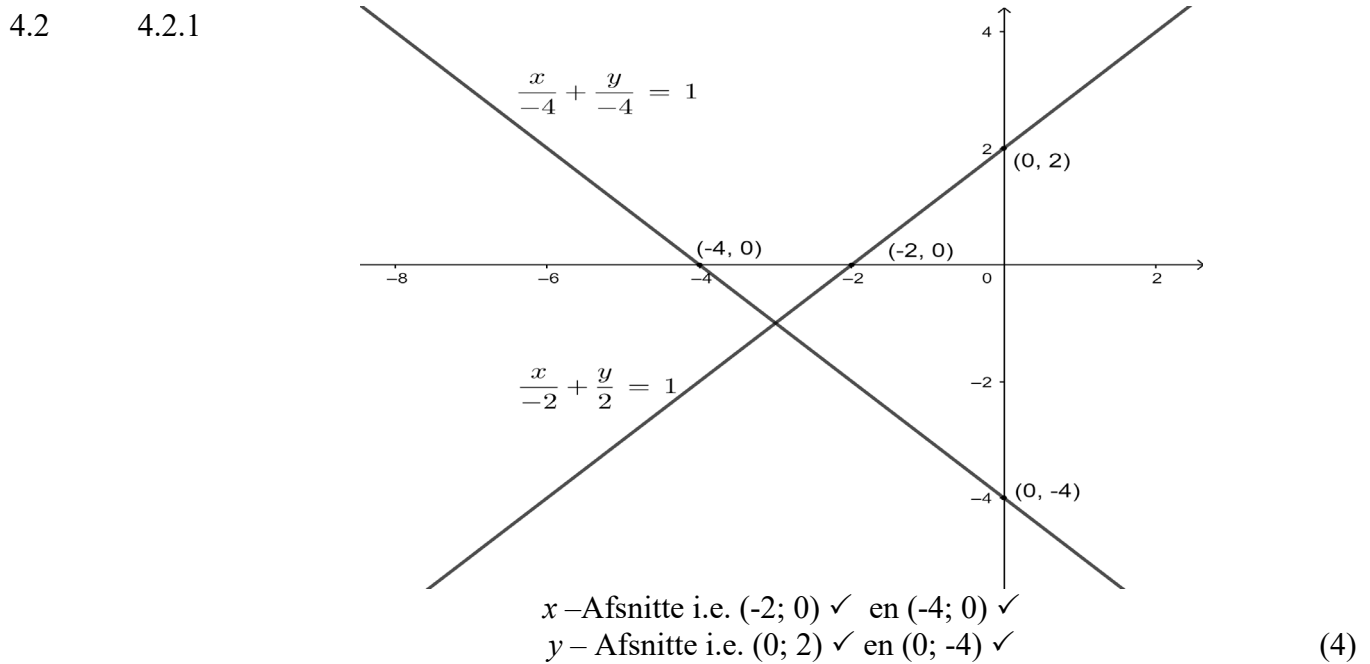
SLEGS ANTWOORD: Volpunte (2)
[14]

VRAAG 4

4.1 4.1.1 $\frac{4}{3}\pi r^3 = \pi r^2 h$
 $\frac{4}{3}\pi r^3 = 9\pi r^2 \checkmark$
 $\pi r^2 \left(\frac{4}{3}r - 9\right) = 0 \checkmark$
 $r = \frac{27}{4} \checkmark$ $r = 6.75 \text{ cm}$ (3)

4.1.2 $SA_{\text{sfeer}} = 4\pi r^2$
 $= 4\pi(6.75)^2 \checkmark$
 $= \frac{729\pi}{4} \text{ cm}^2 \checkmark$ $SA_{\text{sfeer}} = 572,555 \text{ cm}^2$ (2)

4.1.3 $SA_{\text{silinder}} = 2\pi r^2 + 2\pi rh$
 $= 2\pi(6.75)^2 + 2\pi(6.75) \times 9 \checkmark$
 $= \frac{1701\pi}{8} \text{ cm}^2 \checkmark$ $= 667,981 \text{ cm}^2$ (2)



4.2.2 $(-3; -1) \checkmark \checkmark$ (2)

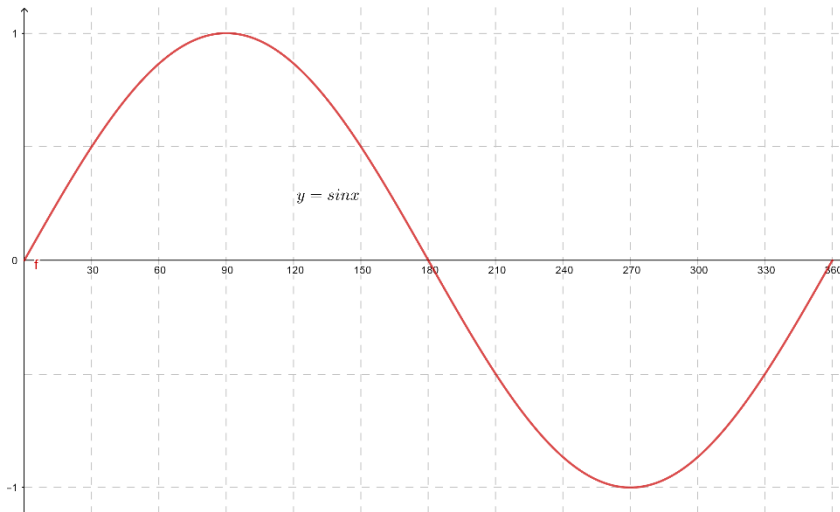
4.3 4.3.1 A $(3; 0) \checkmark$ en B $(6; 0) \checkmark$ (2)

4.3.2 C $(0; -18) \checkmark$ en D $(9; -18) \checkmark$ (2)

4.3.3 $\checkmark \checkmark$
E $(4.5; 2.25)$ (2)

VRAAG 5

5.1.1



Draaipunte $(90^\circ; 1)$ ✓

en $(270^\circ; -1)$ ✓

Vorm ✓

x -afsnitte by

$0^\circ; 180^\circ; 360^\circ$ ✓

(4)

5.1.2

$$x = 330^\circ \checkmark \text{ en } x = 210^\circ \checkmark$$

(2)

5.2

$$\begin{aligned} \cot 26^\circ 48' &= \frac{1}{\tan \left(26^\circ + \frac{48}{60} \right)} \\ &= \frac{1}{\tan 26.8^\circ} \checkmark \\ &= 1,980 \checkmark \end{aligned}$$

(2)

5.3

5.3.1

$$\begin{aligned} \tan 67^\circ &= \frac{91}{BD} \\ BD &= \frac{91}{\tan 67^\circ} \checkmark \\ BD &= 38,627 \text{ m} \checkmark \end{aligned}$$

(2)

5.3.2

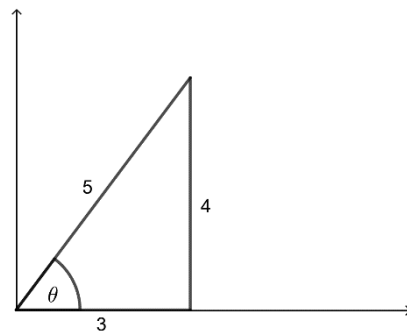
$$\begin{aligned} \tan 53^\circ &= \frac{AB}{38,627} \checkmark \\ AB &= 38,627 \tan 53^\circ \\ AB &= 51,26 \text{ m} \checkmark \end{aligned}$$

$$\begin{aligned} AC &= 51,26 \text{ m} + 91 \text{ m} \\ AC &= 142,26 \text{ m} \checkmark \end{aligned}$$

(3)

5.4

$$\begin{aligned} x &= \sqrt{5^2 - 4^2} \\ x &= 3 \checkmark \\ \cos^2 \theta + \tan^2 \theta &= \left(\frac{3}{5} \right)^2 + \left(\frac{4}{3} \right)^2 \checkmark \\ &= \frac{481}{225} \checkmark \end{aligned}$$



(3)
[16]

VRAAG 6

6.1	5.6 rads $= 5,6 \times 57.3 \checkmark$ $= 320^\circ + 0,88 \times 60'$ $= 320^\circ 53' \checkmark$	ALTERNATIEF $5.6 \text{ rads} = \frac{5,6 \times 180^\circ}{\pi} \checkmark$ $= 320^\circ + 0,86 \times 60'$ $= 320^\circ 52' \checkmark$	(2)
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6.2	6.2.1 $l = \frac{45.5}{5}$ $l = 9,1 \checkmark \text{ cm}$	(1)
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6.2.2	$\theta = \frac{2\pi}{5}$ $\theta = 1,257 \checkmark \text{ rads}$	(1)
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6.2.3	$A = \frac{1}{2} r^2 \theta$ $A = \frac{1}{2} (7,242)^2 \times 1,257 \checkmark$ $A = 32,963 \checkmark \text{ cm}^2$	$C = 2\pi r$ $r = \frac{45,5}{2\pi}$ $r = 7,242 \checkmark \text{ cm}$	(3)
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6.3	6.3.1 $n = \frac{1}{10} \text{ revs. per sekonde}$ $v = \pi D n$ $v = \pi \times 7250 \times 2 \times \frac{1}{10} \checkmark$ $v = 4555,309 \checkmark \text{ m/s}$	(2)
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6.3.2	$\omega = \frac{v}{r}$ $\omega = \frac{4555,309}{7250} \checkmark$ $\omega = 0,628 \checkmark \text{ rad/s}$	$\omega = 2\pi n$ $\omega = 2\pi \left(\frac{1}{10}\right) \checkmark$ $\omega = 0,628 \checkmark \text{ rad/s}$	(2)
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6.4	As $D = x$ $\therefore h = \frac{D}{2} \checkmark \checkmark$	(2)
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6.5	$\text{Area} = \left[\frac{(1\text{st} + \text{Laaste ordinaat})}{2} + \Sigma \text{van ander ordinate} \right] \times \text{gemeenskaplike afstand}$ $\text{Area} = \left[\frac{3 + 0.52}{2} + 6,1 + 8,2 + 7,2 + 9,2 + 7,3 + 1,3 + 3,1 \right] \times \frac{350}{1000}$ $\text{Area} = 15,456 \checkmark \text{ km}^2$	(3) [16]
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TOTAAL: 100