



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NASIENRIGLYN

NASIONALE SERTIFIKAAT

WISKUNDE N2

26 Maart 2025

Hierdie nasienriglyn bestaan uit 9 bladsye.

VRAAG 1

1.1 1.1.1 $S = ut + \frac{1}{2}gt^2$
 $\Rightarrow S - ut = \frac{1}{2}gt^2 \checkmark$
 $\Rightarrow 2(S - ut) = gt^2 \checkmark$
 $\Rightarrow g = \frac{2(S - ut)}{t^2}$

$$\begin{aligned} S &= ut + \frac{1}{2}gt^2 \\ \Rightarrow 2S &= 2ut - gt^2 \checkmark \\ \Rightarrow 2S - 2ut &= gt^2 \checkmark \\ \Rightarrow g &= \frac{2S - 2ut}{t^2} \checkmark \end{aligned}$$

(3)

1.1.2 $g = \frac{2(250 - 15 \times 10)}{(10)^2}$
 $= 2 \checkmark$

(1)

1.2 1.2.1 $-4(p + 5) = 2(8 - p)$
 $\Rightarrow -4p - 20 = 16 - 2p \checkmark$
 $\Rightarrow p = -18 \checkmark$

(2)

1.2.2 $6p^2 + p - 1 = 0$
 $\Rightarrow (2x + 1)(3x - 1) = 0 \checkmark \checkmark$
 $\Rightarrow p = -\frac{1}{2} = -0,5 \checkmark$ or $p = \frac{1}{3} = 0,333 \checkmark$

(4)

1.3 Eq. 1: $-8a + 12b = 32$
 Eq. 2: $-2a - 3b = 14$
 Eq. 1 $\Rightarrow b = \frac{8a + 32}{12}$ ----- Eq. 3 $\checkmark$
 Eq. 3 in Eq. 2 $\Rightarrow -2a - 3\left(\frac{8a + 32}{12}\right) = 14 \checkmark$
 $\Rightarrow a = -\frac{11}{2} = -5,5 \checkmark$
 Eq. 3 $\Rightarrow b = \frac{8\left(-\frac{11}{2}\right) + 32}{12} = -1 \checkmark$

ALTERNATIEF

Eq. 1: $-8a + 12b = 32$
 Eq. 2: $-2a - 3b = 14$
 Eq. 1 $- 4(\text{Eq. 2}) \Rightarrow -24b = -24 \checkmark$
 $\Rightarrow b = -1 \checkmark$
 Eq. 1 $\Rightarrow -8a + 12(-1) = 32 \checkmark$
 $\Rightarrow a = -\frac{44}{8} = -\frac{11}{2} = -5,5 \checkmark$

(4)

[14]

Let wel: Aanvaar enige ander metode wat tot korrekte antwoorde lei.

VRAAG 2

$$2.1 \quad 2.1.1 \quad \begin{aligned} 3p + 3q - 9 - pq &= (3 - q)(p - 3) \checkmark \checkmark \\ 7p^2 - 63 &= 7(p + 3)(p - 3) \checkmark \checkmark \checkmark \end{aligned} \quad (5)$$

$$2.1.2 \quad \begin{aligned} \text{GGD} &= (p - 3) \checkmark \text{ en} \\ \text{KGV} &= 7(p + 3)(p - 3)(3 - q) \checkmark \checkmark \text{ OF } -7(p + 3)(p - 3)(q - 3) \checkmark \checkmark \end{aligned} \quad (3)$$

$$2.2 \quad 2.2.1 \quad \begin{aligned} &\frac{y + 3}{y^2 + 6y + 9} + \frac{1 - x}{xy - 2y + 3x - 6} \\ &= \frac{y + 3}{(y + 3)^2 \checkmark} + \frac{1 - x}{(x - 2)(y + 3) \checkmark} \\ &= \frac{1}{y + 3 \checkmark} + \frac{1 - x}{(x - 2)(y + 3)} \\ &= \frac{x - 2 + 1 - x \checkmark}{(x - 2)(y + 3) \checkmark} \\ &= \frac{-1 \checkmark}{(x - 2)(y + 3)} \end{aligned} \quad (6)$$

$$2.2.2 \quad \begin{aligned} &\frac{x^2 - 6x + 9}{9x + 3} \times \frac{9x^2 - 1}{x - 3} \times \frac{4x - 8}{x^2 - 5x + 6} \\ &= \frac{(x - 3)(x - 3) \checkmark}{3(3x + 1) \checkmark} \times \frac{(3x - 1)(3x + 1) \checkmark}{(x - 3)} \times \frac{4(x - 2) \checkmark}{(x - 3)(x - 2) \checkmark} \\ &= \frac{4(3x - 1)}{3} \quad \checkmark \end{aligned} \quad \begin{matrix} (6) \\ [20] \end{matrix}$$

VRAAG 3

$$\begin{aligned}
 3.1 \quad 3.1.1 \quad \log\left(\frac{64}{27}\right) &= \log 64 - \log 27 \quad \checkmark \\
 &= \log 4^3 - \log 3^3 \quad \checkmark \\
 &= 3\log 4 - 3\log 3 \quad \checkmark \\
 &= 3p - 3q \quad \checkmark
 \end{aligned}$$

$$\begin{aligned}
 \log\left(\frac{64}{27}\right) &= \log\left(\frac{4}{3}\right)^3 \quad \checkmark \\
 &= 3\log\left(\frac{4}{3}\right) \quad \checkmark \\
 &= 3(\log 4 - \log 3) \quad \checkmark \\
 &= 3(p - q) \quad \checkmark
 \end{aligned}$$

(4)

$$\begin{aligned}
 3.1.2 \quad \log_{27} 64 &= \frac{\log 64}{\log 27} \quad \checkmark \\
 &= \frac{\log 4^3}{\log 3^3} \quad \checkmark \\
 &= \frac{3\log 4}{3\log 3} \quad \checkmark \\
 &= \frac{p}{q} \quad \checkmark
 \end{aligned}$$

(4)

$$\begin{aligned}
 3.2 \quad \frac{\sqrt[3]{\sqrt[4]{y^{36}x^{18}}}}{(8x^2y)(6xy^3)} &= \frac{x^{18 \times \frac{1}{3} \times \frac{1}{4}} \times y^{36 \times \frac{1}{3} \times \frac{1}{4}}}{48x^{(2+1)}y^{(3+1)}} \quad \checkmark \\
 &= \frac{x^{\frac{3}{2}} \times y^3}{48x^3y^4} \quad \checkmark \\
 &= \frac{1}{48x^{3/2}y} \quad \checkmark
 \end{aligned}$$

(3)

$$\begin{aligned}
 3.3 \quad \left(\frac{1}{64}\right)^{2-3x} &= \frac{1}{2} \\
 \Rightarrow (2^{-6})^{2-3x} &= 2^{-1} \quad \checkmark \\
 \Rightarrow -12 + 18x &= -1 \quad \checkmark \\
 \Rightarrow 18x &= 11 \quad \checkmark \\
 \Rightarrow x &= \frac{11}{18} = \frac{5}{9} = 0,611 \quad \checkmark
 \end{aligned}$$

$$\begin{aligned}
 \left(\frac{1}{64}\right)^{2-3x} &= \frac{1}{2} \\
 \Rightarrow \left(\frac{1}{2}\right)^{6(2-3x)} &= \frac{1}{2} \quad \checkmark \\
 \Rightarrow 12 - 18x &= 1 \quad \checkmark \\
 \Rightarrow 18x &= 11 \quad \checkmark \\
 \Rightarrow x &= \frac{11}{18} = \frac{5}{9} = 0.611 \quad \checkmark
 \end{aligned}$$

(4)

VRAAG 4

$$\begin{aligned}
 4.1 \quad 4.1.1 \quad \text{Oppervlakte} &= 2\pi rh \\
 &= 2\pi(3)(20) \checkmark \\
 &= 120\pi m^2 \text{ OF } 376,991m^2 \checkmark
 \end{aligned}$$

$$\begin{aligned}
 4.1.2 \quad \text{Volume} &= \pi r^2 h \checkmark \\
 &= \pi(3)^2 \times 20 \checkmark \\
 &= 180\pi m^3 \text{ OF } 565,487m^3 \checkmark
 \end{aligned}$$

(2 × 2) (4)

$$\begin{aligned}
 4.2 \quad 4.2.1 \quad 4\pi r^2 &= 800 \\
 \Rightarrow r^2 &= \frac{800}{4\pi} \checkmark \\
 \Rightarrow r &= \sqrt{\frac{800}{4\pi}} \\
 \Rightarrow r &= 7,979cm \checkmark
 \end{aligned}$$

$$\begin{aligned}
 4.2.2 \quad \text{Volume} &= \frac{4}{3}\pi r^3 \\
 &= \frac{4}{3}\pi(7,979)^3 \checkmark \\
 &= 2127,816 cm^3 \checkmark
 \end{aligned}$$

(2 × 2) (4)

$$\begin{aligned}
 4.3 \quad \text{Opp} &= \left[\frac{\text{Eerste ordinaat} + \text{Laaste ordinaat}}{2} + \text{som van alle ordinate} \right] \times \text{afstand} \\
 9999 \checkmark &= \left[\frac{70 + 68 \checkmark}{2} + 75 + 85 + 90 + 95 + 110 + 105 + 100 + 95 + 85 \right] d \\
 \Rightarrow 9999 &= 909d \checkmark \\
 \Rightarrow d &= 11 \checkmark
 \end{aligned}$$

(4)
[12]

VRAAG 5

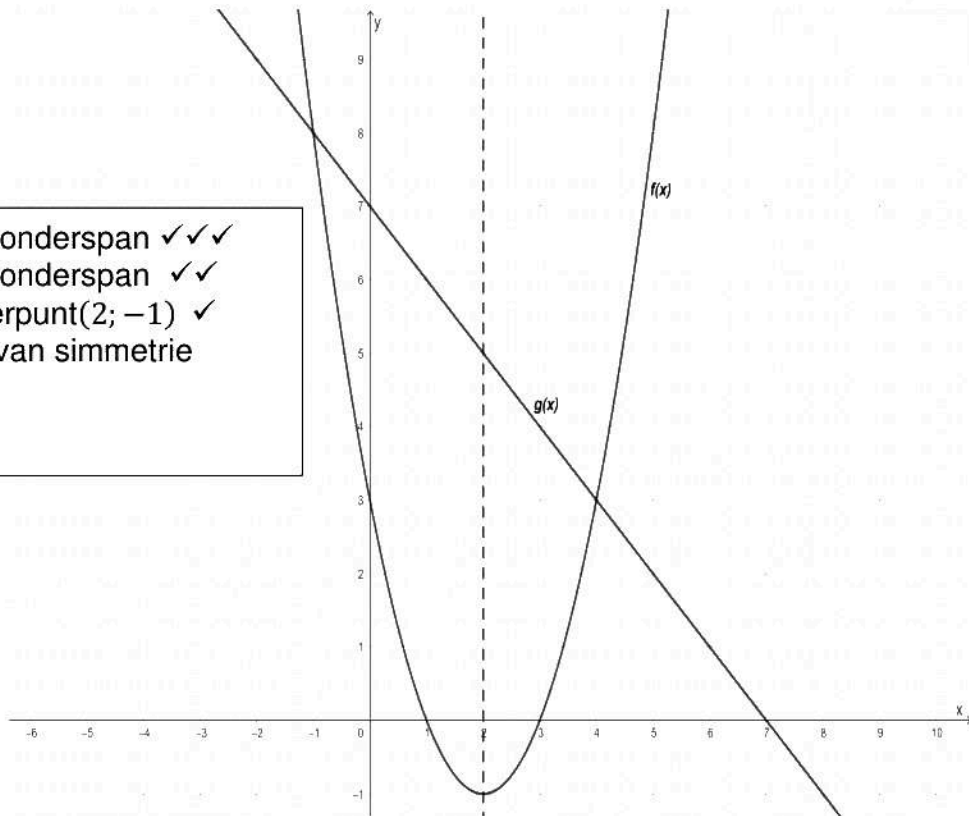
5.1 5.1.1

x	-1	0	1	2	3	4	5
$f(x)$	8	3	0	-1	0	3	8
$g(x)$	8	7	6	5	4	3	2

(2)

5.1.2

x – onderspan ✓✓✓
 y – onderspan ✓✓
 Keerpunt(2; -1) ✓
 As van simmetrie ✓



(7)

5.1.3 $(-1; 8)$ ✓ en $(4; 3)$ ✓

(2)

5.1.4 $x = -\frac{-4}{2(1)} = 2$ ✓

(1)

5.1.5 $(2; -1)$ ✓

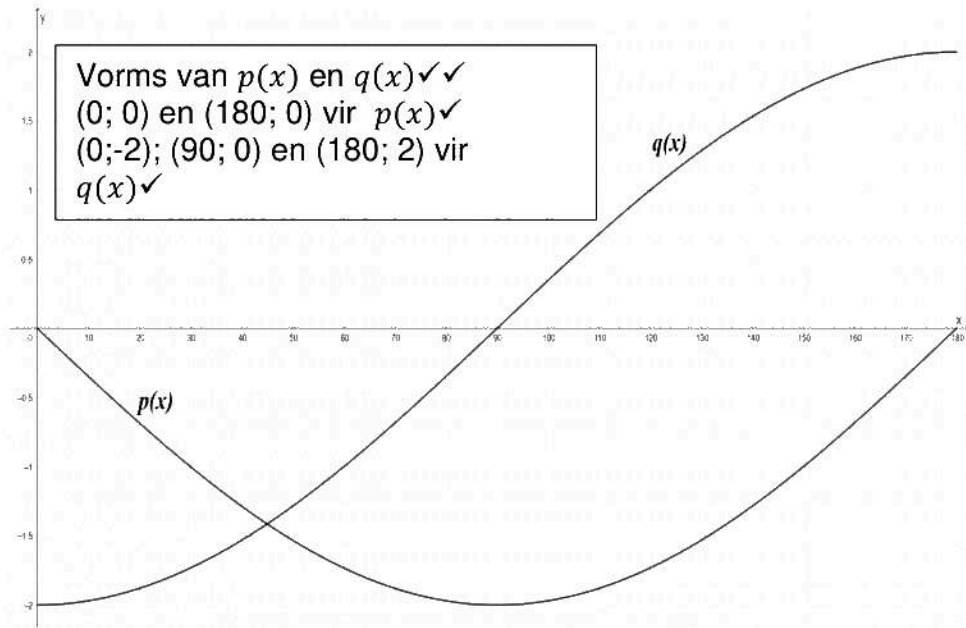
(1)

5.2 5.2.1

x	0	30	60	90	120	150	180
$p(x)$	0	-1	-1,7	-2	-1,7	-1	0
$q(x)$	-2	-1,7	-1	0	1	1,7	2

(1)

5.2.2



(4)

5.2.3 $x = 45^\circ$ en $y = -1,4$ ✓✓

(2)

[20]

LET WEL: Aanvaar akkuraatheid van ± 1 vir x waardes en $\pm 0,1$ vir y waardes

VRAAG 6

6.1 $36^\circ 48' = 36^\circ + \frac{48}{60} = 36,8^\circ$ ✓

$\Rightarrow \tan 36^\circ 48' = 0,748$ ✓

(2)

6.2 6.2.1 $l = r\theta$

$\Rightarrow r = \frac{8,7}{0,88}$

$= \frac{435}{44} \text{ cm}$

$= 9,886 \text{ cm}$ ✓

(1)

$$\begin{aligned}
 6.2.2 \quad \text{Oppervlakte} &= \frac{1}{2} r^2 \theta \\
 &= \frac{1}{2} (9,886)^2 \times (0,88) \checkmark \\
 &= 43,003 \text{cm}^2 \checkmark \\
 &= \frac{7569}{176} \text{cm}^2
 \end{aligned}$$

ALTERNATIEF

$$\begin{aligned}
 \text{Oppervlakte} &= \frac{l^2}{2\theta} \\
 &= \frac{(8,7)^2}{2(0,88)} \checkmark \\
 &= 43,006 \text{cm}^2 \checkmark \\
 &= \frac{7569}{176} \text{cm}^2
 \end{aligned}$$

(2)

$$\begin{aligned}
 6.3 \quad 6.3.1 \quad V &= \pi DN \\
 &= \pi \left(\frac{39}{1000} \right) \times 55 \checkmark \\
 &= 2,145\pi \text{ m/s} \checkmark \\
 &= \frac{429\pi}{200} \text{ m/s} \\
 &= 6,739 \text{m/s}
 \end{aligned}$$

$$\begin{aligned}
 6.3.2 \quad V &= \omega R \\
 \Rightarrow \frac{429\pi}{200} &= \omega \left(\frac{39}{2 \times 1000} \right) \checkmark \\
 \Rightarrow \omega &= 110\pi \text{rads/sec} \checkmark \\
 \Rightarrow \omega &= 345,575 \text{rads/sec}
 \end{aligned}$$

(2 × 2)

(4)

$$\begin{aligned}
 6.4 \quad D &= \frac{x^2}{4h} + h \\
 \Rightarrow 3x &= \frac{x^2}{4(4)} + 4 \checkmark \\
 \Rightarrow x^2 - 48x + 64 &= 0 \checkmark \\
 \Rightarrow x &= \frac{48 \pm \sqrt{(48)^2 - 4(1)(64)}}{2(1)} \checkmark
 \end{aligned}$$

$$\Rightarrow x = 46,627 \text{cm} \checkmark \text{ of } x = 1,373 \text{cm} \checkmark$$

(5)

6.5

6.5.1

$$\cos 55^\circ = \frac{DB}{50} \quad \checkmark$$

$$\Rightarrow DB = 50 \cos 55^\circ = 28,679\text{m} \quad \checkmark$$

OF

$$\hat{A} = 90^\circ - 55^\circ = 35^\circ$$

$$\sin 35^\circ = \frac{DB}{50} \quad \checkmark$$

$$\Rightarrow DB = 50 \sin 35^\circ = 28,679\text{m} \quad \checkmark$$

(2)

6.5.2

$$\begin{aligned} AB &= \sqrt{(50)^2 - (28,679)^2} \quad \checkmark \\ &= 40,957\text{m} \quad \checkmark \end{aligned}$$

OF

$$\sin 55^\circ = \frac{AB}{50} \quad \checkmark$$

$$\Rightarrow AB = 50 \sin 55^\circ = 40,958\text{m} \quad \checkmark$$

OF

$$\cos 35^\circ = \frac{AB}{50} \quad \checkmark$$

$$\Rightarrow AB = 50 \cos 35^\circ = 40,958\text{m} \quad \checkmark$$

OF

$$\tan 55^\circ = \frac{AB}{28,679} \quad \checkmark$$

$$\Rightarrow AB = 28,679 \tan 55^\circ = 40,958\text{m} \quad \checkmark$$

OF

$$\tan 35^\circ = \frac{28,679}{AB} \quad \checkmark$$

$$\Rightarrow AB = \frac{28,679}{\tan 35^\circ} = 40,958 \text{ m} \quad \checkmark$$

(2)

6.5.3

$$AC = AB + BC = 40,958\text{M} + 20\text{M} = 68,958\text{M}$$

(1)

[19]

TOTAAL: 100