



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NASIENRIGLYN

NASIONALE SERTIFIKAAT

WISKUNDE N2

26 Julie 2024

Hierdie nasienriglyn bestaan uit 7 bladsye.

VRAAG 1

- 1.1 Laat 'g' = die meisie se ouderdom
 $\Rightarrow 4g + 4 = 100$ ✓
 $\Rightarrow 4g = 96$
 $\Rightarrow g = 24$ years ✓

OPMERKING: Aanvaar enige veranderlike vir die meisie se ouderdom.

(2)

- 1.2 $8f^2 - 6f + 1 = 0$
 $\Rightarrow (2f - 1)(4f - 1) = 0$ ✓
 $\Rightarrow f = \frac{1}{2}$ ✓ **OF** $f = \frac{1}{4}$ ✓

(3)

- 1.3 $7x = 6y - 3$ ----- (Eq1)
 $3y + 4x - 1 = 0$ ----- (Eq2)
 $(Eq1) \Rightarrow x = \frac{6}{7}y - \frac{3}{7}$ ----- (Eq3) ✓
 $(Eq3)$ na $(Eq2)$
 $\Rightarrow 3y + 4\left(\frac{6}{7}y - \frac{3}{7}\right) - 1 = 0$ ✓
 $\Rightarrow y = \frac{19}{45} = 0,422$ ✓
 $(Eq3) \Rightarrow x = -\frac{1}{15} = -0,067$ ✓

ALTERNATIEF

$$\begin{aligned} 28x - 24y &= -12 \text{ ----- } (Eq1) \times 4 \\ 21y + 28x &= 7 \text{ ----- } (Eq2) \times 7 \quad \checkmark \\ (Eq1) - (Eq2) & \\ \Rightarrow -45y &= -19 \quad \checkmark \\ \Rightarrow y &= \frac{-19}{-45} = \frac{19}{45} = 0,422 \quad \checkmark \\ (Eq2) \Rightarrow x &= \frac{7 - 21(0,422)}{28} \\ &= -0,067 \quad \checkmark \end{aligned}$$

OPMERKING: Aanvaar enige ander metode.

(4)

- 1.4 1.4.1 $h = \frac{\sqrt{n^3 - pt^3}}{m}$
 $\Rightarrow hm = \sqrt{n^3 - pt^3}$ ✓
 $\Rightarrow (hm)^2 = n^3 - pt^3$
 $\Rightarrow (hm)^2 + pt^3 = n^3$ ✓
 $\Rightarrow n = \sqrt[3]{(hm)^2 + pt^3}$ ✓

(3)

- 1.4.2 $n = \sqrt[3]{(2,15 \times 2,5)^2 + 2(3)^3} = 4,360$

(1)

[13]

VRAAG 2

$$\begin{aligned}
 2.1 \quad 2.1.1 \quad & \frac{p^2 - 2p}{p^2 + 2p} \div \frac{p^2 - 4}{p^2 - 4p + 4} \div \frac{2p^2 + 4p}{p^2 + 4p + 4} \\
 & = \frac{p(p-2)}{p(p+2)} \checkmark \times \frac{(p-2)^2 \checkmark}{(p+2)(p-2) \checkmark} \times \frac{(p+2)^2 \checkmark}{2p(p+2) \checkmark} \\
 & = \frac{(p-2)^2}{2p(p+2)} \checkmark
 \end{aligned} \tag{6}$$

$$\begin{aligned}
 2.1.2 \quad & \frac{2r-1}{6r^2-23r+20} - \frac{r+2}{2r^2-r-10} - \frac{r+2}{3r^2+2r-8} \\
 & = \frac{2r-1}{(3r-4)(2r-5)} \checkmark - \frac{r+2}{(r+2)(2r-5)} \checkmark - \frac{r+2}{(3r-4)(r+2)} \checkmark \\
 & = \frac{2r-1}{(3r-4)(2r-5)} - \frac{1}{(2r-5)} - \frac{1}{(3r-4)} \checkmark \\
 & = \frac{2r-1-(3r-4)-(2r-5)}{(3r-4)(2r-5)} \checkmark \\
 & = \frac{8-3r}{(3r-4)(2r-5)} \checkmark
 \end{aligned} \tag{6}$$

$$\begin{aligned}
 2.2 \quad 2.2.1 \quad & 24xy - 9x^2y^2 = 3xy(8 - 3xy) \checkmark \checkmark \\
 & 256 - 36x^2y^2 = 4(8 - 3xy)(8 + 3xy) \checkmark \checkmark \checkmark
 \end{aligned} \tag{5}$$

$$\begin{aligned}
 2.2.2 \quad & \text{GGD} = 8 - 3xy \checkmark \\
 & \text{KGV} = 12xy(8 - 3xy)(8 + 3xy) \checkmark \checkmark
 \end{aligned} \tag{3}$$

[20]

VRAAG 3

$$\begin{aligned}
 3.1 \quad 3.1.1 \quad & \log \frac{2}{7} = \log 2 - \log 7 \checkmark \\
 & = m - n \checkmark
 \end{aligned} \tag{2}$$

$$\begin{aligned}
 3.1.2 \quad & \log 196 = \log 14^2 \checkmark \\
 & = 2\log(2 \times 7) \checkmark \\
 & = 2(\log 2 + \log 7) \checkmark \\
 & = 2(m + n) \checkmark
 \end{aligned}$$

ALTERNATIEF

$$\begin{aligned}
 \log 196 & = \log(4 \times 49) \checkmark \\
 & = 2\log(2^2 \times 7^2) \checkmark \\
 & = 2\log 2 + 2\log 7 \checkmark \\
 & = 2m + 2n \checkmark
 \end{aligned}$$

OPMERKING: Aanvaar enige ander metode.

(4)

$$\begin{aligned}
 3.2 \quad 3.2.1 \quad & \frac{t^{3u-v-2w} \times t^{5u-4w}}{t^{u-6v-3w}} = t^{3u-v-2w+5u-4w-u+6v+3w} \checkmark \\
 & = t^{7u+5v-3w} \checkmark
 \end{aligned}$$

$$\begin{aligned}
 3.2.2 \quad & \log_2 \sqrt{8} - \log_3 \sqrt{27} \\
 &= \log_2 (2)^{\frac{3}{2}} - \log_3 (3)^{\frac{3}{2}} \quad \checkmark \\
 &= \frac{3}{2} - \frac{3}{2} \quad \checkmark \\
 &= 0 \quad \checkmark
 \end{aligned}$$

OPMERKING: Geen punt vir antwoord alleen nie.

OPMERKING: Aanvaar enige ander metode.

ALTERNATIEF

$$\begin{aligned}
 & \log_2 \sqrt{8} - \log_3 \sqrt{27} \\
 &= \frac{\log_3 \sqrt{8}}{\log_3 2} - \log_3 (3)^{\frac{3}{2}} \quad \checkmark \\
 &= \frac{\log_3 (2)^{\frac{3}{2}}}{\log_3 2} - \log_3 (3)^{\frac{3}{2}} \quad \checkmark \\
 &= \frac{3}{2} - \frac{3}{2} \\
 &= 0 \quad \checkmark
 \end{aligned}$$

(3)

$$\begin{aligned}
 3.3 \quad & \frac{\sqrt[4]{x^3}}{\sqrt{14x + 2x(\sqrt{8})^0}} = \frac{3}{4} \\
 & \Rightarrow \frac{x^{\frac{3}{4}}}{\sqrt{16x}} = \frac{3}{4} \quad \checkmark \\
 & \Rightarrow \frac{x^{\frac{3}{4}}}{4x^{\frac{1}{2}}} = \frac{3}{4} \quad \checkmark \\
 & \Rightarrow x^{\frac{3}{4} - \frac{1}{2}} = 3 \quad \checkmark \\
 & \Rightarrow x^{\frac{1}{4}} = 3 \\
 & \Rightarrow x = 3^4 = 81 \quad \checkmark
 \end{aligned}$$

(4)

[15]

VRAAG 4

$$\begin{aligned}
 4.1 \quad 4.1.1 \quad & SA = \pi r \sqrt{h^2 + r^2} + \pi r^2 \\
 & \Rightarrow 250 \pi = 5 \pi \sqrt{h^2 + 25} + 25 \pi \quad \checkmark \\
 & \Rightarrow 225 \pi = 5 \pi \sqrt{h^2 + 25} \\
 & \Rightarrow 45 = \sqrt{h^2 + 25} \quad \checkmark \\
 & \Rightarrow 2025 = h^2 + 25 \\
 & \Rightarrow 2000 = h^2 \quad \checkmark \\
 & \Rightarrow h = \sqrt{2000} = 20\sqrt{5} \text{ cm} = 44,721 \text{ cm} \quad \checkmark
 \end{aligned}$$

(4)

$$\begin{aligned}
 4.1.2 \quad & l = \sqrt{h^2 + r^2} \\
 &= \sqrt{(20\sqrt{5})^2 + (5)^2} \quad \checkmark \quad \text{OF} \quad l = \frac{SA - \pi r^2}{\pi r} \\
 &= 45 \text{ cm} \quad \checkmark \\
 &= \frac{250\pi - 25\pi}{5\pi} \quad \checkmark \\
 &= 45 \text{ cm} \quad \checkmark
 \end{aligned}$$

(2)

$$\begin{aligned}
 4.1.3 \quad & V = \frac{1}{3} \pi r^2 h \\
 &= \frac{1}{3} \times \pi (5)^2 \times 20\sqrt{5} \quad \checkmark \\
 &= 1\,170\,804 \text{ cm}^3 \quad \text{OF} \quad \frac{500\sqrt{5}}{3} \pi \text{ cm}^3 \quad \checkmark
 \end{aligned}$$

4.2

$$\text{Area} = \left[\frac{1}{2} + \frac{3}{2} + \frac{5}{2} + \frac{7}{2} + \frac{13}{2} + \frac{x}{2} + \frac{x-4}{2} + \frac{11}{2} \right] \times 6 \checkmark$$

$$\Rightarrow 144 = \left[19 + \frac{2x-4}{2} \right] \times 6 \checkmark$$

$$\Rightarrow x = 7 \checkmark$$

(4)
[12]

VRAAG 5

5.1 5.1.1 $y = -9$

(1)

5.1.2 $-x^2 + 6x - 9 = 0$
 $\Rightarrow x = 3 \checkmark$ **OF** $x = 3 \checkmark$

(2)

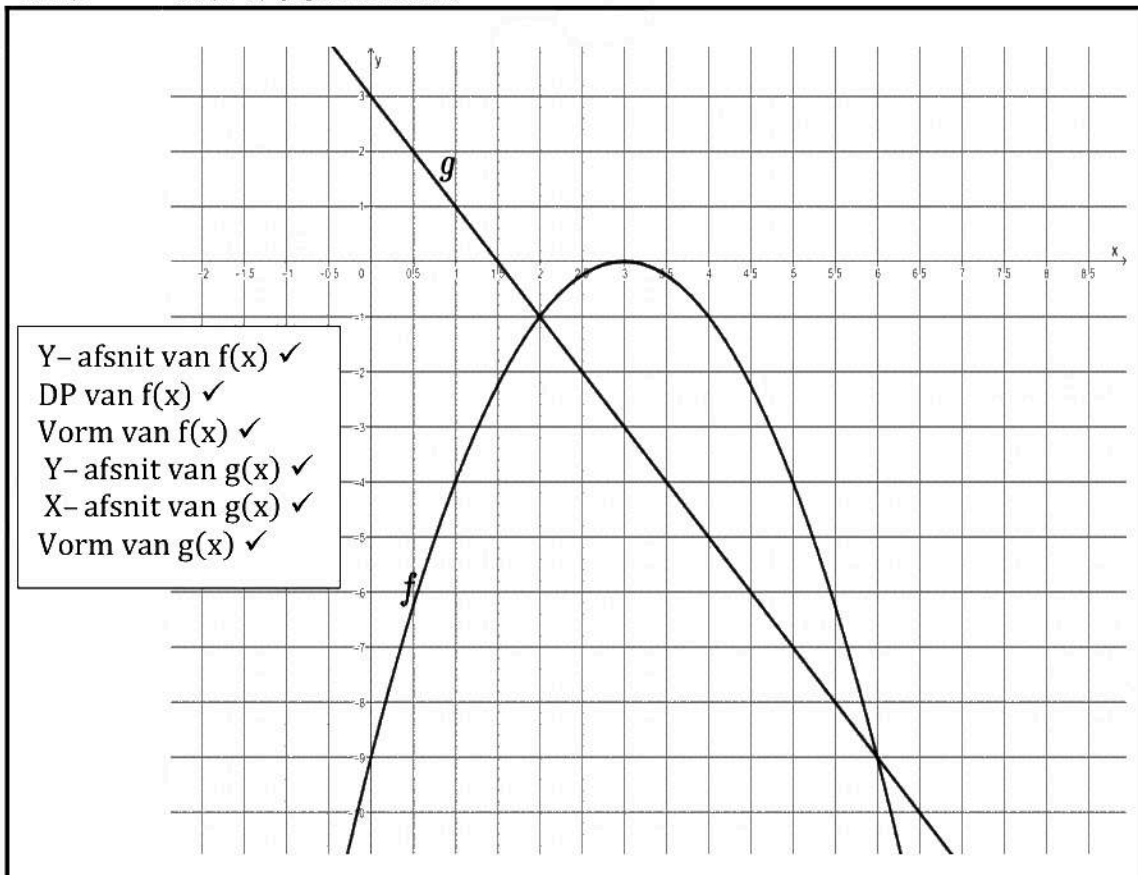
5.1.3 $x = \frac{-(6)}{2(-1)} = 3 \checkmark$

(1)

5.1.4 $y = -(3)^2 + 6(3) - 9 = 0$

(1)

5.1.5 ANTWOORDBLAD



(3)

5.2 5.2.1 Kyk 5.1.5 – ANTWOORDBLAD

(3)

5.2.2 $(2; -1) \checkmark$ **en** $(6; -9) \checkmark$

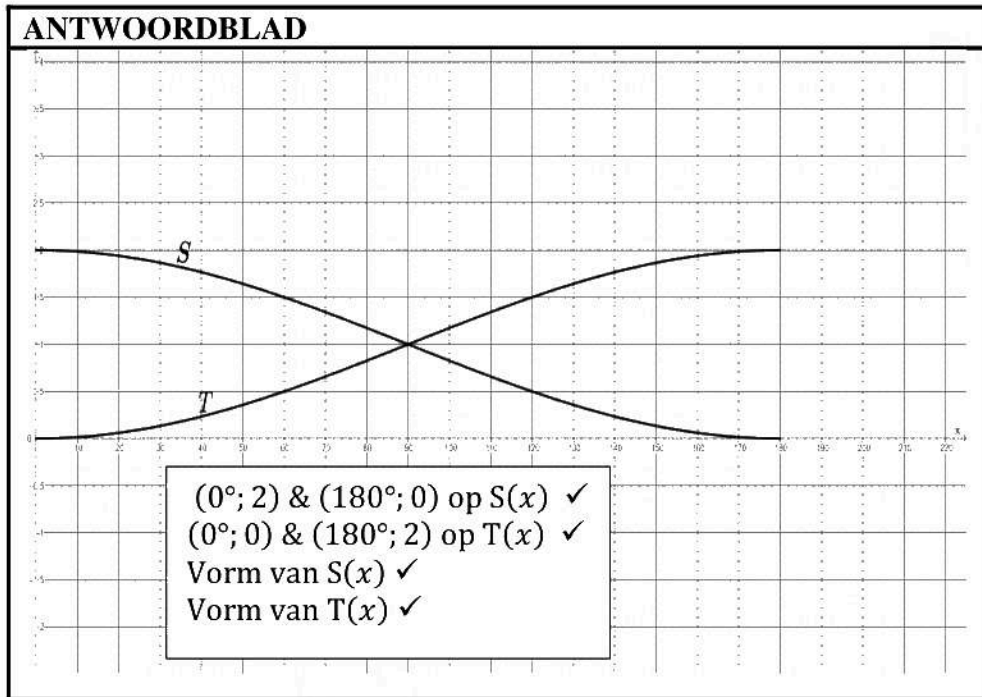
5.3 5.3.1

x	0°	30°	60°	90°	120°	150°	180°
$S(x)$	2	1.866	1,5	1	0,5	0,134	0
$T(x)$	0	0.134	0,5	1	1,5	1,866	2

OPMERKING: 1 punt vir enige 2 korrekte waardes✓✓

(2)

5.3.2



(4)

5.3.3 (90°; 1)

(1)

[20]

VRAAG 6

6.1

$$47^\circ 24' = 47^\circ + \frac{24}{60} = 47,4^\circ$$

(1)

6.2

6.2.1

$$\theta = \frac{360}{6} \times \frac{\pi}{180} \checkmark$$

$$= \frac{\pi}{3} \text{ OF } 1,047 \text{ rads } \checkmark$$

(2)

6.2.2

$$l = r\theta = 4 \times \frac{\pi}{3} = \frac{4\pi}{3} = 4,189 \text{ cm}$$

(1)

6.2.3

$$A = \frac{1}{2}r^2\theta = \frac{1}{2} \times (4)^2 \times \frac{\pi}{3} \checkmark$$

$$= \frac{8\pi}{3} \text{ cm}^2 \text{ OF } 8,378 \text{ cm}^2 \checkmark$$

(2)

$$6.3 \quad 6.3.1 \quad n = \frac{2\,460}{60} \quad \checkmark$$

$$= 41 \text{ revolusies per sekonde (r/s)} \quad \checkmark \quad (2)$$

$$6.3.2 \quad \omega = 2\pi n = 2\pi \times 41 = 82\pi = 257,611 \text{ radiale per sekonde (rad/s)} \quad (1)$$

$$6.4 \quad D = \frac{x^2}{4h} + h$$

$$= \frac{(3,5)^2}{4(14)} + 14 \quad \checkmark$$

$$= \frac{455}{32} \text{ cm} \quad \text{OF} \quad 14,219 \text{ cm} \quad \checkmark$$

$$\Rightarrow r = \frac{455}{64} \text{ cm} \quad \text{OF} \quad 7,109 \text{ cm} \quad \checkmark \quad (3)$$

$$6.5 \quad 6.5.1 \quad \sin 36^\circ = \frac{27}{AC} \quad \checkmark$$

$$\Rightarrow AC = \frac{27}{\sin 36^\circ} = 45,935 \text{ cm} \quad \checkmark$$

$$6.5.2 \quad \tan 36^\circ = \frac{27}{AB} \quad \checkmark$$

$$\Rightarrow AB = \frac{27}{\tan 36^\circ} = 37,162 \text{ cm} \quad \checkmark$$

ALTERNATIEF

$$AB = \sqrt{(45,935)^2 - (27)^2} \quad \checkmark$$

$$= 37,162 \text{ cm} \quad \checkmark$$

$$6.5.3 \quad \hat{C} = 180^\circ - 36^\circ - 90^\circ = 54^\circ \quad \checkmark$$

$$\therefore 1 - \cos 2\hat{C} = 1 - \cos 108^\circ = 1,309 \quad \checkmark$$

(3 × 2) (6)

$$6.6 \quad r = \sqrt{(\sqrt{14})^2 + (\sqrt{11})^2} = 5 \quad \checkmark$$

$$\therefore \sin \theta = -\frac{\sqrt{11}}{5} \quad \checkmark$$

(2)
[20]

TOTAAL: 100