higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NASIENRIGLYN

NASIONALE SERTIFIKAAT

WISKUNDE N2

26 Julie 2021

Hierdie nasienriglyn bestaan uit 9 bladsye.

Kopiereg voorbehou

VRAAG 1

1.1 1.1.1
$\log_a 1$
$= \log_a a^0$
$= 0$ ✓ (1)

1.1.2
$\frac{2^{-4}p^2q^{-3}}{8p^{-3}q^{-2}}$
$= \frac{p^2p^3}{2^4 2^3 q^3 q^{-2}}$ ✓
$= \frac{p^5}{128q}$ ✓ (2)

1.2 1.2.1
$\log_6 10 - \log_6 9 - \log_6 40$
$= \log_6 \frac{10}{9\times 40}$ ✓
$= \log_6 \frac{1}{36}$ ✓
$= \log_6 6^{-2}$ ✓
$= -2$ ✓ (4)

1.2.2
$\log_4 8 - \log_9 3$
$= \frac{\log_2 8}{\log_2 4} - \frac{1}{\log_3 9}$ ✓
$= \frac{3\log_2 2}{2\log_2 2} - \frac{1}{2\log_3 3}$
$= \frac{3}{2} - \frac{1}{2}$ ✓
$= 1$ ✓ (3)

1.3 1.3.1
$\sqrt[5]{x^3} = 125$
$x^{\frac{3}{5}} = 5^3$
$x = 5^{3\times\frac{5}{3}}$ ✓
$x = 3\ 125$ ✓ (2)

1.3.2
$\log_{\sqrt{x}} \sqrt{x} = 3^{2x-5}$
$1 = 3^{2x-5}$ ✓
$3^0 = 3^{2x-5}$ ✓
$0 = 2x - 5$
$x = \frac{5}{2}$ ✓ (3)

[15]

VRAAG 2

2.1 2.1.1

$$\frac{3x^2-2xy-y^2}{2x^2+xy-3y^2}\div\frac{xy-3y^2}{2x^2-3xy-9y^2}$$

$$=\frac{(3x+y)(x-y)\checkmark}{(2x+3y)(x-y)\checkmark}\times\frac{(x-3y)(2x+3y)\checkmark}{y(x-3y)\checkmark}$$

$$=\frac{3x+y}{y}\checkmark$$ (5)

2.1.2

$$\frac{2y-1}{6y^2-23y+20}+\frac{y+2}{2y^2-y-10}-\frac{2+y}{3y^2+2y-8}$$

$$=\frac{2y-1}{(3y-4)(2y-5)}\checkmark+\frac{y+2}{(y+2)(2y-5)}\checkmark-\frac{2+y}{(3y-4)(y+2)}\checkmark$$
$$=\frac{2y-1}{(3y-4)(2y-5)}+\frac{1}{(2y-5)}-\frac{1}{(3y-4)}$$
$$=\frac{2y-1+3y-4-(2y-5)}{(3y-4)(2y-5)}\checkmark$$

$$=\frac{3y}{(3y-4)(2y-5)}\checkmark$$ (5)

2.2 2.2.1

$6b-3c+2ab-ac$
$=2b(3+a)-c(3+a)$
$=(2b-c)(3+a)\checkmark\checkmark$

$6-a-a^2$
$=(3+a)(2-a)\checkmark\checkmark$

$-7a^2+63$
$=-7(a^2-9)\checkmark$
$=-7(a+3)(a-3)\checkmark$ (6)

2.2.2 $GGD=(3+a)$ (1)

2.2.3 $KGV=-7(3+a)(a-3)(2-a)(2b-c)$ (3)

ALTERNATIEF

Commented [1]: Kontrleer Engelse spelling: ALTERNATIVE

2.2 2.2.1

$6b-3c+2ab-ac$
$=2b(3+a)-c(3+a)$
$=(2b-c)(3+a)\checkmark\checkmark$

$6-a-a^2$
$=-(a^2+a-6)$
$=-(a+3)(a-2)\checkmark\checkmark$

$-7a^2+63$
$=-7(a^2-9)\checkmark$
$=-7(a+3)(a-3)\checkmark$ (6)

2.2.2 $GGD=(a+3)$ (1)

2.2.3 $KGV=7(a+3)(a-3)(a-2)(2b-c)$ ✓ ✓ ✓ (3)

[20]

VRAAG 3

3.1 $Laat$ "a" $= die\ man\ se\ ouderdom$
$5a - 3 = 97$✓
$5a = 100$
$a = 20\ years$✓ (2)

3.2 $4n^2 - 15n - 47 = 0$
$n = \dfrac{15 \pm \sqrt{(-15)^2 - 4(4)(-47)}}{2(4)}$
$n = \dfrac{15 \pm \sqrt{977}}{8}$✓
$n = 5{,}782$✓ of $n = -2{,}032$✓ (3)

3.3 3.3.1
$H = \dfrac{7{,}5U}{273 + V}$
$\Rightarrow\ H(273 + V) = 7{,}5U$✓
$\Rightarrow 273 + V = \dfrac{7{,}5U}{H}$✓
$\Rightarrow V = \dfrac{7{,}5U}{H} - 273$✓

ALTERNATIEF
$H = \dfrac{7{,}5U}{273 + V}$
$H(273 + V) = 7{,}5U$✓
$273H + HV = 7{,}5U$✓
$V = \dfrac{7{,}5U - 273H}{H}$✓ (3)

3.3.2 $V = \dfrac{7{,}5 \times 0{,}5}{0{,}005} - 273$
$= 477$✓ (1)

3.4 $8p - 1 = -2q\ (1)$
$2q + 3p = 4(2)$
$(1) \Rightarrow q = \dfrac{8p - 1}{-2}(3)$✓
$(3)\ into\ (2) \Rightarrow 2\left(\dfrac{8p - 1}{-2}\right) + 3p = 4$✓
$p = -\dfrac{3}{5}$✓
$q = \dfrac{29}{10}$✓

ALTERNATIEF

$8p - 1 = -2q$	$2q + 3p = 4$
$2q + 8p = 1$	Eq 2 - Eq 1

$2q + 3p = 4$
$-(2q + 8p = 1)$
$-5p = 3$
$p = -\dfrac{3}{5}$
$q = \dfrac{29}{10}$ (4)

ALTERNATIEF
$8p - 1 = -2q - - - - - - - - - - (1)$
$2q + 3p = 4 - - - - - - - - - - - (2)$
$(2) \Rightarrow q = \dfrac{4 - 3P}{2} - - - - - - (3)$✓
$(3)\ in\ (1) \Rightarrow 8p - 1 = -2\left(\dfrac{4 - 3p}{2}\right)$✓
$\Rightarrow p = -\dfrac{3}{5}$✓
$(3)\ \Rightarrow q = \dfrac{29}{10}$✓

[13]

VRAAG 4

4.1 4.1.1

$V = \frac{1}{3}\pi r^2 h$
$285 = \frac{1}{3}\pi r^2 \times 15$ ✓
$r^2 = 18{,}144$ ✓
$r = 4{,}26\ cm$ ✓ (3)

4.1.2

$l = \sqrt{r^2 + h^2}$
$l = \sqrt{4{,}26^2 + 15^2}$ ✓
$l = 15{,}593\ cm$ ✓ (2)

4.1.3

$SA = \pi rl + \pi r^2$
$SA = \pi(4{,}26)(15{,}593) + \pi(4{,}26)^2$ ✓
$SA = 265{,}696\ cm^2$ ✓ (2)

4.2 4.2.1

$y = -6$ (1)

4.2.2

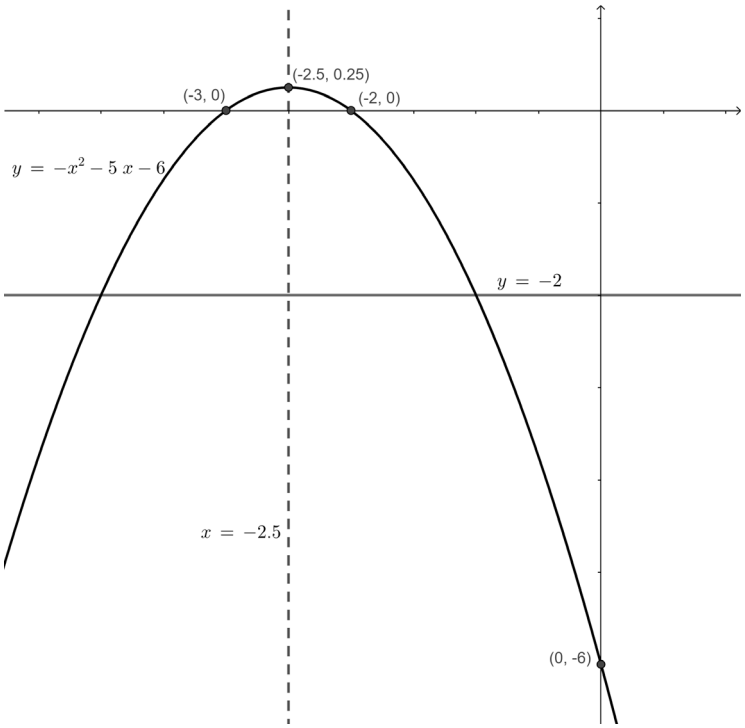
$x = -2$ ✓ or $x = -3$ ✓ (2)

4.2.3

$x = \frac{-b}{2a}$
$x = \frac{-(-5)}{2(-1)}$
$x = \frac{5}{2}$ ✓ (1)

4.2.4

$y = -\left(-\frac{5}{2}\right)^2 - 5\left(-\frac{5}{2}\right) - 6$
$y = 0{,}25$ ✓
$y = \frac{1}{4}$ (1)



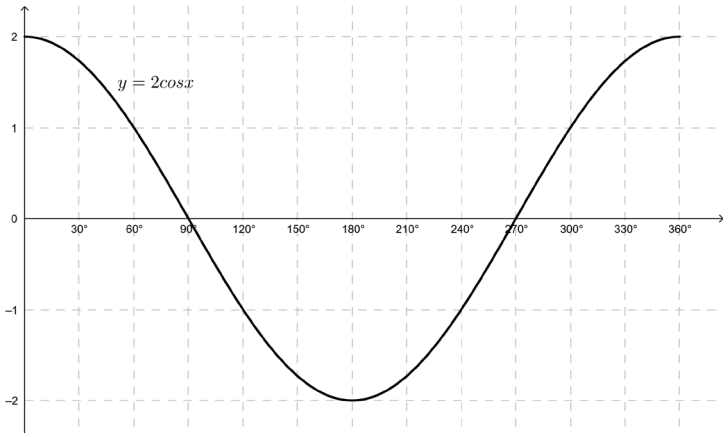
4.2.5 Draaipunt✓
x-afsnitte✓✓
y-afsnit✓
Simmetrie-as✓ (5)

4.3 Horisontale lyn deur die y-afsnit (0; –2) ✓ (1)

4.4 $x = -4$ ✓
$x = -1$✓ (2)
[20]

VRAAG 5

5.1 5.1.1



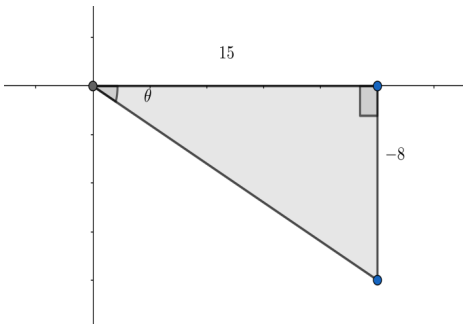
Beginpunt (0°; 2)✓
x-afsnitte (90°; 0)✓ (270°; 0)✓
Draaipunt (180°; -2) ✓
Eindpunt (360°; 2) ✓ (5)

5.1.2 $x = 120° \ and \ x = 240°$ (1)

5.2 $7\text{cosec}\,116°6'$
$= 7{,}795$ ✓ (1)

5.3 $r = \sqrt{15^2 + (-8)^2}$
$r = 17$ ✓

$\therefore sin\theta = -\frac{8}{17}$ ✓



(2)

5.4 5.4.1

$\sin \hat{A} = \frac{BC}{AC}$

$\sin 41° = \frac{17}{AC}$ ✓

$AC = \frac{17}{\sin 41°}$

$AC = 25{,}912$ ✓cm (2)

5.4.2

$\tan \hat{A} = \frac{BC}{AB}$

$\tan 41° = \frac{17}{AB}$ ✓

$AB = \frac{17}{\tan 41°}$

$AB = 19{,}556\ cm$ ✓ (2)

ALTERNATIEF

$AB = \sqrt{(25{,}912)^2 - (17)^2}$ ✓

$AB = 19{,}556\ cm$ ✓

5.4.3

$\hat{C} = 49°$ ✓

$\cos^2(C)$

$= \cos^2(49)$ ✓

$= 0{,}430$ ✓ (3)

ALTERNATIEF

$\cos^2(C) = \left(\frac{BC}{AC}\right)^2$ ✓

$\cos^2(C) = \left(\frac{17}{25{,}912}\right)^2$ ✓

$\cos^2(C) = 0{,}430$ ✓

[16]

VRAAG 6

6.1 $21{,}70°$
$= 21° + (0{,}70 \times 60)'$
$= 21°42'$✓ (1)

6.2 6.2.1 $\theta = \frac{l}{r}$
$= \frac{7{,}5}{10.5}$✓
$= 0{,}714$✓ $radiale$ (2)

6.2.2 $A = \frac{1}{2}r^2\theta$
$= \frac{1}{2}(10{,}5)^2 \times \frac{5}{7}$✓
$= 39{,}375$ ✓cm^2 (2)

6.3 6.3.1 $N = 31\ revs.per\ sekonde$
$N = 31 \times 60$
$N = 1\,860$ ✓ $revs.per\ minuut$ (1)

6.3.2 $v = \pi DN$
$95 = \pi \times D \times 31$✓
$D = \frac{95}{\pi \times 31}$
$D = 0{,}975\ cm$✓ (2)

6.3.3 $r = \frac{0{,}975}{2}$
$= 0{,}488\ cm$ ✓ (1)

6.4 $D = \frac{x^2}{4h} + h$
$(4 \times 2) = \frac{(6{,}9)^2}{4h} + h$✓
$32h = 47{,}61 + 4h^2$
$4h^2 - 32h + 47{,}61 = 0$✓
$h = \frac{-(-32) \pm \sqrt{(-32)^2 - 4(4)(47{,}61)}}{2(4)}$✓
$h = 1{,}976$ $H = 6{,}024$✓ (4)

6.5 Area = (afstand tussen ordinate) × (som van ander midordinate)
341✓ $= \left[\frac{1.2 + 2.2}{2} + 6.2 + 9.2 + 2.3 + 1.3 + 8.2 + 5.2\right] \times d$✓
$341 = 34.1d$
$d = 10$✓ (3)

[16]

TOTAAL: 100

Kopiereg voorbehou