



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

AOS-PROEFSTUDIE NASIENRIGLYNE 2022 WISKUNDE: AFRIKAANS GRAAD 9

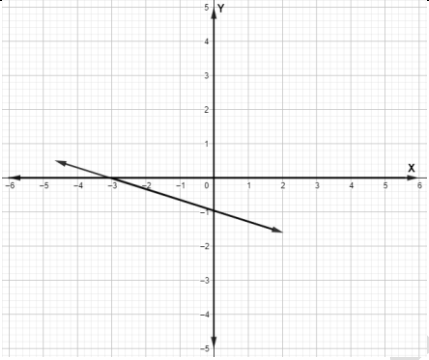
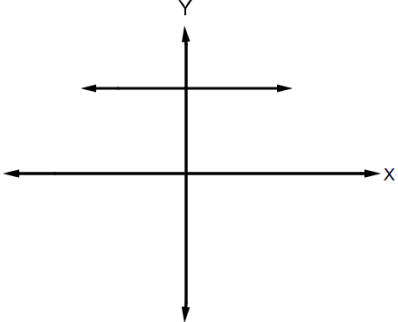
BYLAAG A

- Een punt per antwoord.
- Geen halfpunte word toegeken nie.
- Dui die korrekte antwoord met 'n regmerk (✓) aan en onderstreep die verkeerde antwoord.
- Geen punte moet toegeken word indien leerders meer as een antwoord gekies het. Onderstreep almal.
- Indien daar geen antwoord aangedui is nie, ignoreer die vraag.

Nr	Verwagte antwoord	Opsie
1.	'n Irrasionale getal	D
2.	$14 = 2 \times 7$ $16 = 2 \times 2 \times 2 \times 2$ $\therefore \text{KGV} = 2 \times 2 \times 2 \times 2 \times 7$ $= 112$	B
3.	$s = \frac{d}{t}$ $s = \frac{180}{2}$ $s = 90 \text{ km/h}$ $t = \frac{210}{60}$ $t = 3,5 \text{ h}$ $d = s \times t$ $d = 90 \times 3,5$ $d = 315 \text{ km}$	D
4.	$= 3[-(14)] + 4 \times 2$ $= -42 + 8$ $= -34$	D

Nr	Verwagte antwoord	Opsie																								
5.	$\begin{aligned} &= \frac{3(-2(2) \times 3) + 6(2)^2(3)^2}{2 \times 3} \\ &= \frac{3(-12) + 216}{6} \\ &= \frac{180}{6} \\ &= 30 \end{aligned}$	B																								
6.	$\begin{aligned} &= \frac{-64}{2 \times 2} + \frac{8}{2} - 4 \\ &= -16 + 4 - 4 \\ &= -16 \end{aligned}$	A																								
7.	$\begin{aligned} &= a^{12-3} \\ &= a^9 \end{aligned}$	B																								
8.	$\begin{aligned} &= \frac{1}{5} + \frac{1}{6} = \frac{11}{30} = \frac{11}{30} \times \frac{30}{1} = 11 \end{aligned}$	D																								
9.	$\begin{aligned} &= 2^3(x^5)^6 \\ &= 8x^{30} \end{aligned}$	D																								
10.	$\begin{aligned} &= 1 - 1 + 5^6 \div 5^6 \\ &= 1 - 1 + 1 = 1 \end{aligned}$	A																								
11.	25 <table border="1"><tr><td>Figuur</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Kolletjies</td><td>7</td><td>13</td><td>19</td><td>25</td></tr></table>	Figuur	1	2	3	4	Kolletjies	7	13	19	25	C														
Figuur	1	2	3	4																						
Kolletjies	7	13	19	25																						
12.	$\frac{T_5}{T_4} = \frac{T_4}{T_3} = \frac{T_3}{T_2} = \frac{T_2}{T_1}$ $a = 16 \text{ en } b = \frac{1}{16}$	C																								
13.	<table border="1"><tr><td>Rangskikkings</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr><tr><td>Aantal tafels</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr><tr><td>Aantal Mense</td><td>4</td><td>8</td><td>8</td><td>16</td><td>12</td><td>24</td><td>16</td></tr></table> <p>Reeks 1: Rangskikkings 1; Rangskikkings 3 Rangskikkings 5; ...</p> <p>Reeks 2: Rangskikkings 2; Rangskikkings 4; Rangskikkings 6;...</p> <p>Die reël vir die 7^{de} rangskikkings is 4n.</p>	Rangskikkings	1	2	3	4	5	6	7	Aantal tafels	1	2	3	4	5	6	7	Aantal Mense	4	8	8	16	12	24	16	B
Rangskikkings	1	2	3	4	5	6	7																			
Aantal tafels	1	2	3	4	5	6	7																			
Aantal Mense	4	8	8	16	12	24	16																			
14.	10 handdrukke	A																								
15.	$-\frac{1}{4}$	C																								
16.	7xay + 3axy	D																								

Nr	Verwagte antwoord	Opsie
17.	$x^2 + 7xy - 15y^2$	A
18.	$= \frac{16x^3 + 8x^2}{-2x^2}$ $= \frac{8x^2(2x + 1)}{-2x^2}$ $= -4(2x + 1)$ $= -8x - 4$	D
19.	$= (1 - 3a)(1 + 3a)$	B
20.	$= 3x(x^2 + 3x - 10)$ $= 3x(x + 5)(x - 2)$	D
21.	$L = (x + 1)$ en $W = (x - 2)$	D
22.	$= \frac{6(x^2 + 3x - 10)}{48x} \times \frac{8x}{x^2 - 4}$ $= \frac{6(x + 5)(x - 2)}{48x} \times \frac{8x}{(x - 2)(x + 2)}$ $= \frac{(x + 5)}{(x + 2)}$	C
23.	$= 15(s^4 - z^4)$ $= 15(s^2 - z^2)(s^2 + z^2)$ $= 15(s - z)(s + z)(s^2 + z^2)$	C
24.	$x - 5 = -7$ $x = -2$	C
25.	$3x + 1 = 10$ $3x = 9$ $x = 3$	D
26.	$x = 0$ of $x = 4$	B
27.	$6^{x-1} = 6^2$ $\therefore x - 1 = 2$ $x = 3$	B
28.	$-6 = 12x - 18$ $12 = 12x$ $x = 1$	B
29.	$y = x^2 + c$ $a = (-1)^2 + 2$ $a = 3$	A
30.	$3x(6x - 8) = 0$ $3x = 0 \text{ of } 6x - 8 = 0$ $x = 0 \text{ of } x = \frac{4}{3}$	D
31.	$4x^2 - 4x - 48 = 0 \dots (\div 4)$ $x^2 - x - 12 = 0$ $(x + 3)(x - 4) = 0$ $x = -3 \text{ or } x = 4$	D

Nr	Verwagte antwoord	Opsie
32.	$d^2 = l^2 + w^2$...Stelling van Pyth. $(w + 9)^2 = (w + 7)^2 + w^2$ $w^2 + 18w + 81 = w^2 + 14w + 49 + w^2$ $w^2 - 4w - 32 = 0$ $(w - 8)(w + 4) = 0$ $w \neq -4$ or $w = 8$ $l = 8 + 7 = 15$ Opp $= l \times b$ $= 15 \times 8$ $= 120 \text{ cm}^2$	A
33.	$y = -2x - 4$	D
34.	 $y = -\frac{1}{3}x - 1$ $c = -1$ $m = -\frac{1}{3}$	D
35.	Reël: $y = x^2 + 2$ $258 = z^2 + 2$ $z^2 = 256$ $z = 16$	C
36.	 <p>Die y – waardes is almal gelyk aan 4, wat impliseer dat die horisontale lyn bo die X – as is.</p>	A

Nr	Verwagte antwoord	Opsie
37.	$y = mx + c$ $y = mx + 4$ $0 = -3m + 4$ $3m = 4$ $m = \frac{4}{3}$ $\therefore y = \frac{4}{3}x + 4$ $y = \frac{4}{3}(-2) + 4$ $y = \frac{-8}{3} + 4$ $y = \frac{4}{3}$ $\therefore (-2; \frac{4}{3})$ is op die grafiek (Die leerder mag verskillende waardes getoets het om te toets watter punt op die grafiek is. Die y –afsnitte in opsies B en D elimineer hul)	C
38.	$y = 2x - 8$ (lyn AB) $\therefore y = -\frac{1}{2}x + c$ $m \perp AB = -\frac{1}{2}$ $4 = -\frac{1}{2}(-2) + c$ Vervang $(-2; 4)$ in $c = 3$ $\therefore y = -\frac{1}{2}x + 3$	D
39.	$A'(-3; -5)$	B
40.	$(x; y) \longrightarrow (-x; y)$	A
41.	Transleer 5 eenhede op	A
42.	90°	B
43.	80°	A
44.	Verwisselende $AB \parallel CD$	A
45.	$\widehat{AOC} = \widehat{BOD}$ Regoorst. $\angle s =$ $3x - 5^\circ = x + 25^\circ$ $3x - x = 25^\circ + 5^\circ$ $2x = 30^\circ$ $x = 15^\circ$ $\therefore \widehat{AOC} = 3x - 5^\circ$ $= 3(15^\circ) - 5^\circ$ $= 45^\circ - 5^\circ$ $= 40^\circ$	D
46.	$\widehat{BOD} = 90^\circ$ $AD \perp BE$, $x + 5^\circ + 35^\circ = 90^\circ \dots \angle e$ op 'n reguit lyn $\therefore x = 50^\circ$	D
47.	Die twee hoeke teenoor gelyke sye is gelyk.	D

Nr	Verwagte antwoord		Opsie
48.	<p>$\widehat{M\hat{G}H} = \widehat{G\hat{M}H} = \widehat{G\hat{H}M} = 60^\circ \angle e$ v. gelyks. Δ $\widehat{G\hat{H}D} + \widehat{G\hat{H}M} = 180^\circ \angle e$ op 'n reguit lyn $\widehat{G\hat{H}D} = 120^\circ$ $\widehat{E\hat{G}B} = \widehat{G\hat{H}D}$ Ooreen. $\angle e =$, AB//CD $4y + 20^\circ = 120^\circ$ $4y = 100^\circ$ $\therefore y = \frac{100}{4}$ $= 25^\circ$</p> <p>OF $\widehat{M\hat{G}H} = \widehat{G\hat{M}H} = \widehat{G\hat{H}M} = 60^\circ \angle e$ v. gelyks. Δ $\widehat{B\hat{G}H} = \widehat{G\hat{M}H} = 60^\circ \dots$ Verw. $\angle e$, AB//CD $4y + 20^\circ + 60^\circ = 180^\circ \dots \angle e$ op 'n reg. lyn $4y + 20^\circ = 120^\circ$ $4y = 100^\circ$ $\therefore y = \frac{100}{4}$ $= 25^\circ$</p>	<p>OF $\widehat{A\hat{G}M} = \widehat{G\hat{M}H} = 60^\circ$ Verw. $\angle e$, AB//CD $\widehat{A\hat{G}H} = \widehat{A\hat{G}M} + \widehat{M\hat{G}H}^\circ$ $= 60^\circ + 60^\circ$ $= 120^\circ$ $\widehat{A\hat{G}H} = \widehat{E\hat{G}B}$ Regoorst. $\angle e$ $4y + 20^\circ = 120^\circ$ $4y = 100^\circ$ $\therefore y = \frac{100}{4}$ $= 25^\circ$</p>	

Nr	Verwagte antwoord		Opsie
49.	<p>In $\triangle EFG$ en $\triangle ABC$</p> $\frac{EF}{AB} = \frac{FG}{BC} = \frac{EG}{AC}$ $\frac{12 \text{ cm}}{6 \text{ cm}} = \frac{4 \text{ cm}}{2 \text{ cm}} = \frac{8 \text{ cm}}{4 \text{ cm}} = 2$ <p>$\therefore \triangle EFG \parallel \triangle ABC$ Ooreens. sye is proporsioneel</p> $\hat{A}\hat{C}B = \hat{E}\hat{G}F = 86^\circ$ $\hat{B}_1 = \hat{F} = 58^\circ$ <p>$\therefore \hat{A} = \hat{E}_2$ Ooreens.</p> <p>$\angle e$ v gelykvormige $\triangle = 36^\circ$</p> $\hat{E}_1 = \hat{A} \quad \text{Verwis. } \angle e \text{ DE} \parallel \text{AC}$ $= 36^\circ$	<p>OF</p> <p>In $\triangle EFG$ en $\triangle ABC$</p> $\frac{EF}{AB} = \frac{FG}{BC} = \frac{EG}{AC}$ $\frac{12 \text{ cm}}{6 \text{ cm}} = \frac{4 \text{ cm}}{2 \text{ cm}} = \frac{8 \text{ cm}}{4 \text{ cm}} = 2$ <p>$\therefore \triangle EFG \parallel \triangle ABC$ Ooreens. sye is proporsioneel</p> $\hat{B}_1 = \hat{F} \quad \text{Ooreens. } \angle e \text{ v gelykvormige } \triangle$ $\hat{B}_1 = 58^\circ$ $\hat{A} + \hat{B}_1 + \hat{C} = 180^\circ \dots \angle e \text{ van 'n } \triangle$ $\hat{A} + 58^\circ + 86^\circ = 180^\circ$ $\hat{A} = 180^\circ - 144^\circ$ $\hat{A} = 36^\circ$ $\hat{E}_1 = \hat{A} \quad \text{Verwis. } \angle e \text{ DE} \parallel \text{AC}$ $\hat{E}_1 = 36^\circ$	A
50.	<p>$\hat{B}_2 = \hat{B}_1 = 42^\circ$ Diagn. v. rombus halveer die hoeke</p> $\hat{A}\hat{B}\hat{C} = 84^\circ$ $\hat{A}\hat{B}\hat{C} + \hat{B}\hat{C}\hat{D} = 180^\circ \quad \text{Ko-bin. } \angle e \text{ AB} \parallel \text{CD}$ $84^\circ + \hat{B}\hat{C}\hat{D} = 180^\circ$ $\hat{B}\hat{C}\hat{D} = 96^\circ$ $\hat{B}\hat{C}\hat{D} = \hat{B}\hat{C}\hat{A} + \hat{A}\hat{C}\hat{D}$ $96^\circ = \hat{B}\hat{C}\hat{A} + \hat{A}\hat{C}\hat{D}$ <p>But $\hat{B}\hat{C}\hat{A} = \hat{A}\hat{C}\hat{D}$ Diagn. v. rombus halveer die hoeke</p> $\therefore 96^\circ = 2\hat{A}\hat{C}\hat{D}$ $\hat{A}\hat{C}\hat{D} = 48^\circ$		C
51.	<p>$\hat{F}_2 = \hat{B}_1 = 68^\circ$ Verwis. $\angle e \text{ AB} \parallel \text{CD}$</p> <p>$\hat{E}_2 + \hat{B}_1 = 180^\circ$ Ko-bin. $\angle e \text{ ED} \parallel \text{BF}$</p> $\hat{E}_2 + 68^\circ = 180^\circ$ $\hat{E}_2 = 112^\circ$ <p>$\hat{A} + \hat{D}_1 = \hat{E}_2$ Buite \angle v \triangle</p> $\hat{A} + \hat{D}_1 = 112^\circ$ <p>But $\hat{A} = \hat{D}_1$ $\angle e$ teeno. gelyke sye</p> $\therefore 2\hat{A} = 112^\circ$ $\hat{A} = 56^\circ$	<p>OF</p> <p>$\hat{B}_1 = \hat{E}_1 = 68^\circ \dots$ Ooreen. $\angle e \text{ ED} \parallel \text{BF}$</p> $\hat{A} + \hat{D}_1 + \hat{E}_1 = 180^\circ \dots \angle e \text{ v. 'n } \triangle$ $\hat{A} + \hat{D}_1 + 68^\circ = 180^\circ$ $\hat{A} + \hat{D}_1 = 112^\circ$ <p>But $\hat{A} = \hat{D}_1 \dots \angle e$ teenoor gelyke sye</p> $\therefore \hat{A} = 56^\circ$	A
52.	<p>$AC^2 = AB^2 + BC^2 \dots$ Stelling v. Pyth</p> $= (15 \text{ cm})^2 + (8 \text{ cm})^2$ $= 225 \text{ cm}^2 + 64 \text{ cm}^2$ $= 289 \text{ cm}^2$ <p>$AC = 17 \text{ cm}$</p>		C

Nr	Verwagte antwoord	Opsie
53.	$O = 2(l + b) = 40$ $l + b = 20$ Vir maksimum oppervlakte: $l = b = 10$ $\therefore Opp = l^2$ $= 10^2$ $= 100$ Gebruik van verskillende kombinasies anders as 10 gee 'n kleiner oppervlakte bv. $A = 9 \times 11 = 99 \text{ cm}^2$ $A = 8 \times 12 = 96 \text{ cm}^2$	C
54.	Vir 2 kleiner reghoekke $AB = (5 \div 10 = \frac{1}{2}) \text{ cm}$ $BC = 4 \text{ cm}$ $\therefore \text{oppervlakte} = \frac{1}{2} \times 4 = 2 \text{ cm}^2$	B
55.	$Opp = \pi r^2 = 36\pi$ $\therefore r^2 = 36$ $r = 6$ $C = 2\pi r$ $= 2 \times 6 \times \pi$ $= 12\pi$	A
56.	$C = 2\pi r$ $= 2 \times \pi \times 3$ $= 6\pi$ Vir 2 uit 3 kinders: $C = \frac{2}{3} \times 6\pi$ $= 12,57 \text{ cm}$	B
57.	$V = \frac{1}{2} \times b \times h \times l$ $= \left(\frac{1}{2} \times 8 \times 6 \times 14\right) \text{ cm}^3$ $= (4 \times 6 \times 14) \text{ cm}^3$ $= 336 \text{ cm}^3$	A
58.	$BO = 2\pi rh + 2\pi r^2$ $= \left(2 \times \frac{22}{7} \times 7 \times 16 + 2 \times \frac{22}{7} \times 7^2\right) \text{ cm}^2$ $= (2 \times 22 \times 16 + 2 \times 22 \times 7) \text{ cm}^2$ $= (704 + 308) \text{ cm}^2$ $= 1012 \text{ cm}^2$	D

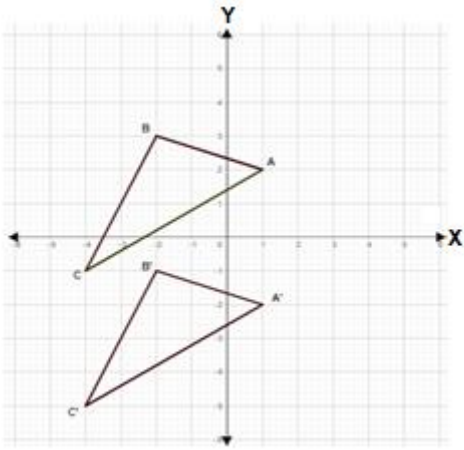
Nr	Verwagte antwoord	Opsie
59.	$300 \text{ ml} = 300 \text{ cm}^3$ $V = \pi r^2 h$ $300 \text{ cm}^3 = \frac{22}{7} \times r^2 \times 13 \text{ cm}$ $\frac{300 \text{ cm}^3}{13 \text{ cm}} \times \frac{7}{22} = r^2$ $\frac{1050}{143} \text{ cm}^2 = r^2$ $r = 2,71 \text{ cm}$ $d = 2 \times 2,71 \text{ cm}$ $= 5,42 \text{ cm}$	B
60.	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> $BO = 2(lb + bh + lh)$ $h = 140 \text{ mm} = 14 \text{ cm}$ $b = 2h$ $b = 2(14) \text{ cm} = 28 \text{ cm}$ $3640 = 2(l(28) + 28(14) + l(14))$ $3640 = 2(28l + 392 + 14l)$ $3640 = 2(42l + 392)$ $3640 = 84l + 784$ $84l = 784$ $l = 34 \text{ cm}$ </div> <div style="width: 45%; text-align: center;"> OF $\frac{3640}{2} = 28l + 392 + 14l$ $1820 - 392 = 42l$ $1428 = 42l$ $\frac{1428}{42} = l$ $34 \text{ cm} = l$ </div> </div>	C

AFDELING B

Nasienriglyne vir Afdeling B		
<ul style="list-style-type: none"> Moet nie die leerder meer as een keer vir dieselfde fout penaliseer nie. Geen halfpunte word toegeken nie. Onderstreep foute wat deur leerder gemaak is. Moet nie 'n kruisie (X) maak nie. In gevalle waar leerders alternatiewe, maar wiskundig korrekte strategieë gebruik het, moet die punte aan die leerder toegeken word. Ken alle punte vir vraag toe indien die korrekte antwoord gegee is sonder dat berekeninge getoon is. 		
M	steutel	'n punt vir die korrekte metode
A		'n punt vir 'n akkurate berekening
KA		'n punt vir konsekwente akkuraatheid

Nr.	Verwagte antwoord	Rasionaal/ Verduideliking	Punt
61.	$2y = 2x + 4$ $y = x + 2$ ✓ A y –afsnit as $x = 0$ $y = 0 + 2$ $y = 2$ x –afsnit as $y = 0$ $0 = x + 2$ $x = -2$	<p>1 punt vir die standaard vorm</p> <p>1 punt vir plot van afsnitte</p> <p>1 punt vir die vorm/gradiënt</p> <p>Volpunte vir die korrekte grafiek geteken</p> <p>OF</p> <p>1 punt plot x –afsnit</p> <p>1 punt plot y –afsnit</p> <p>1 punt vir die vorm/gradiënt</p> <p>NB:</p> <p>1 punt Indien die leerder verkeerde afsnitte geplot het maar die gradiënt is positief.</p>	3

✓KA ✓KA

Nr.	Verwagte antwoord	Rasionaal/ Verduideliking	Punt
62.	<p>A (1 ; 2), B (-2 ; 3) en C (-4 ; -1) A' (1 ; -2) B' (-2 ; -1) C' (-4 ; -5)</p>  <p>✓A✓A✓A</p>	<p>1 punt vir korrekte plot van A'.</p> <p>1 punt vir korrekte plot van B'.</p> <p>1 punt vir korrekte plot van C'.</p> <p>Volpunte vir die korrekte beeld geplot.</p>	3
63.	<p>$\widehat{MNP} = \widehat{MPN} = 54^\circ$ ✓ M ... $\angle e$ teenoor gelyke sye(MN=MP) $\widehat{M} + 54^\circ + 54^\circ = 180^\circ$... som van binne $\angle e$ van \triangle $\widehat{M} = 72^\circ$ KA $\widehat{M} + \widehat{Q} = 180^\circ$... ko-binne $\angle e$ (MN RQ) $\therefore \widehat{Q} = 108^\circ$ ✓ KA</p> <p>OF</p> <p>$\widehat{P}_1 = 54^\circ$... $\angle e$ teenoor gelyke sye(MN=MP) $\widehat{N}_2 = 54^\circ$... Verwisselende $\angle e$ (NR MQ) $\therefore \widehat{Q} = 108^\circ$ ✓ KA ... Teenoorst. $\angle e$ van gram</p> <p>In $\triangle QPR$ $\therefore \widehat{Q} + \widehat{R}_2 + \widehat{P}_3 = 180^\circ$... som van binne $\angle e$ van \triangle maar $\widehat{R}_2 = \widehat{P}_3$... $\angle e$ teenoor gelyke sye (PQ=RQ) $108^\circ + 2\widehat{P}_3 = 180^\circ$ $2\widehat{P}_3 = 72^\circ$ $\widehat{P}_3 = 36^\circ$ ✓ KA $\widehat{P}_1 + y + \widehat{P}_3 = 180^\circ$ maar $\widehat{P}_1 = 54^\circ$... $\angle e$ teenoor gelyke sye (MN=MP) $54^\circ + y + 36^\circ = 180^\circ$... $\angle e$ op 'n reguitlyn $y = 90^\circ$ ✓ KA</p>	<p>1 punt vir bewering en rede</p> <p>1 punt vir \widehat{Q}</p> <p>OF</p> <p>1 punt vir \widehat{Q}</p> <p>1 punt bewering en rede</p> <p>1 punt vir y</p>	

Nr.	Verwagte antwoord	Rasionaal/ Verduideliking	Punt
	= 14,1 km ✓KA	Antwoord Alleenlik Volpunte	

Approved