



GAUTENG PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

**GAUTENG DEPARTMENT OF EDUCATION
GAUTENGSE DEPARTEMENT VAN ONDERWYS**

**PROVINCIAL EXAMINATION
PROVINSIALE EKSAMEN**

NOVEMBER 2019

GRADE / GRAAD 9

**MATHEMATICS
WISKUNDE**

MARKING GUIDELINES / NASIENRIGLYNE

9 pages / bladsye

QUESTION / VRAAG 1

1.1	B
1.2	C
1.3	B
1.4	A
1.5	B
1.6	D
1.7	B
1.8	C
1.9	C
1.10	C

QUESTION / VRAAG 2

2.1	$\frac{36}{100} \div \frac{84}{100}$ $\frac{36}{84} \div \frac{12}{12} \text{ or/ of } \frac{36}{12} \div \frac{84}{12} \checkmark$ $\frac{3}{7}$ $3 : 7 \checkmark \mathbf{A}$	<p>Simplify / Vereenvoudig: 1 mark / 1 punt Answer / Antwoord 1 mark / 1 punt</p>
2.2	$= -4 \left(-\frac{1}{2}\right)^2 \checkmark$ $= -4 \left(\frac{1}{4}\right)$ $= -1 \checkmark \mathbf{A}$	<p>Substitution / Vervanging: 1 mark / 1 punt Answer / Antwoord: 1 mark / 1 punt</p>
2.3	<p>2.3.1</p> $16 - 4^2$ $= 16 - 16 \checkmark \mathbf{CA}$ $= 0 \checkmark \mathbf{A}$	<p>Simplify / Vereenvoudig: 1 mark / 1 punt Answer / Antwoord 1 mark / 1 punt</p>
	<p>2.3.2</p> $2x^2 - x - 15 \checkmark - (x^2 - 2x + 1) \checkmark$ $= 2x^2 - x^2 - x + 2x - 15 - 1 \checkmark$ $= x^2 + x - 16 \checkmark \mathbf{CA}$	<p>Multiply ()s / Vermeningvuldig ()s / 1 mark each / 1 punt elk Simplify / Vereenvoudig: 1 mark / 1 punt Answer / Antwoord: 1 mark / 1 punt</p>
		[10]

QUESTION / VRAAG 3

3.1	$= 5xy\checkmark(12x - 5y + 1)\checkmark$	$5xy$:1 mark / 1 punt $(12x - 5y + 1)$:1 mark / 1 punt
3.2	$= (k - 8)(k + 8)\checkmark\checkmark\mathbf{A}$	$(k - 8)$: 1 mark / 1 punt $(k + 8)$: 1 mark / 1 punt
3.3	$x^2 + 7x - 18$ $= (x - 2)(x + 9)\checkmark\checkmark\mathbf{A}$	$(x - 2)$ 1 mark / 1 punt $(x + 9)$ 1 mark / 1 punt
3.4	$= a(x - y) + 4(x - y)\checkmark\mathbf{A}$ $= (x - y)(a + 4)\checkmark\checkmark\mathbf{A}$	Grouping and common factors / <i>Groepering en gemeenskaplike faktore:</i> 1 mark / 1 punt $(x - y)$ 1 mark / 1 punt $(a + 4)$ 1 mark / 1 punt
		[9]

QUESTION / VRAAG 4

4.1	$3x = 6\checkmark\mathbf{M}$ $x = 2\checkmark\mathbf{CA}$	1 mark for simplification 1 mark / 1 punt <i>vir vereenvoudiging</i> 1 mark for answer / 1 punt <i>vir antwoord</i>
4.2	$x^3 = \left(\frac{1}{2}\right)^3\checkmark\mathbf{M}$ $\therefore x = \frac{1}{2}\checkmark\mathbf{CA}$	1 mark for writing $\frac{1}{8}$ as $\left(\frac{1}{2}\right)^3$ / 1 punt <i>vir skrywe $\frac{1}{8}$ as $\left(\frac{1}{2}\right)^3$ /</i> 1 mark for answer / 1 punt <i>vir antwoord</i>
4.3	$(x - 5)(x - 2) = 0\checkmark\mathbf{M}$ $x = 5$ or /of $x = 2\checkmark\mathbf{CA}$	1 mark for factorising / 1 punt <i>vir faktoriserings</i> 1 mark for answer / 1 punt <i>vir antwoord</i>
		[6]

QUESTION / VRAAG 5

<p>5.1</p>	<p>The price of 1 chicken / <i>Die prys van 1 hoender</i> = Rx</p> <p>The price of 1 turkey / <i>Die prys van 1 kalkoen</i> = $R5x$. ✓M</p> <p>∴ 50 chickens / <i>hoenders</i> = $R50x$ and / <i>en</i> 20 turkeys / <i>kalkoene</i> = $R100x$ ✓M</p> <p>$50x + 100x = 1200$ ✓M $150x = R1200$ $x = \frac{1200}{150} = R8$ ✓M</p> <p>∴ 1 turkey / <i>kalkoen</i> = $5 \times R8 = R40$ ✓CA</p>	<p>1 mark for reasoning / <i>1 punt vir redenasie</i></p> <p>1 mark for reasoning / <i>1 punt vir redenasie</i></p> <p>1 mark for statement / <i>1 punt vir stelling</i></p> <p>1 mark for calculation / <i>1 punt vir bewerking</i></p> <p>1 mark for answer / <i>1 punt vir antwoord</i></p>
<p>5.2</p>	<p>$A = P(1 + ni)$ or / of $P = \frac{A}{(1+ni)}$ ✓M</p> <p>$15000 = P(1 + 0,07 \times 6)$ or / of $P = \frac{15000}{(1+0,07 \times 6)}$ ✓M</p> <p>$15000 = P(1,42)$ or / of $P = \frac{15000}{(1,42)}$</p> <p>$P = R10\,536,38$ ✓CA</p>	<p>1 mark for formula / <i>1 punt vir formule</i></p> <p>1 mark for substitution / <i>1 punt vir vervanging</i></p> <p>1 mark for answer / <i>1 punt vir antwoord</i></p>
<p>5.3</p>	<p>$D = \text{speed} / \textit{spoed} \times \text{time} / \textit{tyd}$ ✓M</p> <p>= 80×3 ✓M</p> <p>= 240 km ✓M</p> <p>$\text{Time} = \frac{\text{distance}}{\text{speed}} / \frac{\text{afstand}}{\text{spoed}}$ ✓M</p> <p>= $\frac{240}{60}$ ✓CA</p> <p>= $4 \text{ hrs} / \textit{ure}$ ✓A</p>	<p>1 mark for formula / <i>1 punt vir formule</i></p> <p>1 mark for substitution / <i>1 punt vir vervanging</i></p> <p>1 mark for answer / <i>1 punt vir antwoord</i></p> <p>1 mark for formula / <i>1 punt vir formule</i></p> <p>1 mark for substitution / <i>1 punt vir vervanging</i></p> <p>1 mark for answer / <i>1 punt vir antwoord</i></p>
		<p>[14]</p>

QUESTION / VRAAG 6

6.1	$y = mx + c$ $c = 6 \checkmark \mathbf{A}$ $m = \frac{y_2 - y_1}{x_2 - x_1}$ $m = \frac{6-0}{0-(-1)} \checkmark \mathbf{CA}$ $m = 6 \checkmark \mathbf{CA}$ <p>\therefore Eqn of / <i>Vglk van</i> $f: y = 6x + 6 \checkmark \mathbf{CA}$ or / of substitute / vervang $c = 6, x = -1$ and / <i>en</i> $y = 0$ into / <i>in</i> $y = mx + c$</p> $0 = m(-1) + 6 \checkmark \checkmark \mathbf{M}$ $m = 6 \checkmark \mathbf{CA}$ <p>\therefore Eqn of / <i>Vglk van</i> $f: y = 6x + 6 \checkmark \mathbf{CA}$</p>	<p>1 mark for $c = 6$ / <i>1 punt vir</i> $c = 6$</p> <p>1 mark for substitution into gradient formula <i>1 punt vir vervanging in gradiënt formule</i></p> <p>1 mark for $m = 6$ / <i>1 punt vir</i> $m = 6$ 1 mark for answer / <i>1 punt vir antwoord</i> or / of</p> <p>1 mark for substitution of $c = 6$ / <i>1 punt vir</i> <i>vervanging van</i> $c = 6$</p> <p>1 mark for substitution of $(-1; 0)$ into $y = mx + c$ / <i>1 punt vir</i> <i>vervanging</i> $(-1; 0)$ in $y = mx + c$ 1 mark for $m = 6$ / <i>1 punt vir</i> $m = 6$</p> <p>1 mark for answer / <i>1 punt vir antwoord</i></p>
6.2	$y = -2 \checkmark \mathbf{A}$	<p>1 mark for answer / <i>1 punt vir antwoord</i></p>
		[5]

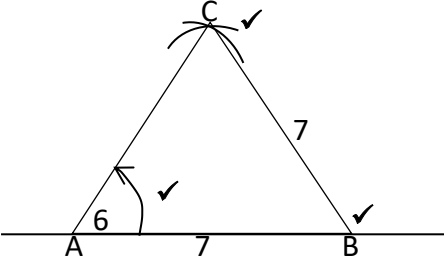
QUESTION / VRAAG 7

7.1.1	<table border="1"> <thead> <tr> <th>Stem / Stam</th> <th>Leaves / Blare</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2✓</td> </tr> <tr> <td>2</td> <td>1 3✓</td> </tr> <tr> <td>3</td> <td>1 5 5 7✓</td> </tr> <tr> <td>4</td> <td>2 3 6 ✓</td> </tr> <tr> <td>5</td> <td>4 5 7✓</td> </tr> </tbody> </table>	Stem / Stam	Leaves / Blare	1	2✓	2	1 3✓	3	1 5 5 7✓	4	2 3 6 ✓	5	4 5 7✓	1 mark for each correct row / <i>1 punt vir elke korrekte ry</i>
Stem / Stam	Leaves / Blare													
1	2✓													
2	1 3✓													
3	1 5 5 7✓													
4	2 3 6 ✓													
5	4 5 7✓													
7.1.2	$Range = 57 - 12$ / $Omvang = 57 - 12$ $R = 45$ ✓ A	1 mark for answer / <i>1 punt vir antwoord</i>												
7.1.3	$50\% = \frac{30}{60}$ $\therefore 10$ learners / <i>leerders</i> ✓ A	1 mark for answer / <i>1 punt vir antwoord</i>												
7.2.1	$P(R) = \frac{5}{15} = \frac{1}{3}$ ✓ A	1 mark for answer / <i>1 punt vir antwoord</i>												
7.2.2	$P(G \text{ or/of } B) = \frac{3}{15} + \frac{7}{15}$ ✓ $P(G \text{ or/of } B) = \frac{2}{3}$ ✓	1 mark for $\frac{3}{15} + \frac{7}{15}$ <i>/ 1 punt vir $\frac{3}{15} + \frac{7}{15}$</i> 1 mark for answer / <i>1 punt vir antwoord</i>												
7.2.3	$P(Y) = 0$ ✓ A	1 mark for answer / <i>1 punt vir antwoord</i>												
		[11]												

QUESTION / VRAAG 8

8.1.1	<table border="1"> <thead> <tr> <th data-bbox="229 376 628 421">Statement / Bewering</th> <th data-bbox="633 376 1072 421">Reason / Rede</th> </tr> </thead> <tbody> <tr> <td data-bbox="229 421 628 465">$65^\circ + 45^\circ + b = 180^\circ$ ✓M</td> <td data-bbox="633 421 1072 465">\angles on a str line/ \anglee op reguit lyn ✓A</td> </tr> <tr> <td data-bbox="229 465 628 582">$b = 70^\circ$ ✓CA</td> <td data-bbox="633 465 1072 582"></td> </tr> </tbody> </table>	Statement / Bewering	Reason / Rede	$65^\circ + 45^\circ + b = 180^\circ$ ✓M	\angle s on a str line/ \angle e op reguit lyn ✓A	$b = 70^\circ$ ✓CA		<p>1 mark for statement / 1 punt vir bewering 1 mark for reason / 1 punt vir rede 1 mark for answer / 1 punt vir antwoord</p>						
Statement / Bewering	Reason / Rede													
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$b = 70^\circ$ ✓CA														
8.1.2	<table border="1"> <thead> <tr> <th data-bbox="229 678 628 723">Statement / Bewering</th> <th data-bbox="633 678 1072 723">Reason / Rede</th> </tr> </thead> <tbody> <tr> <td data-bbox="229 723 628 768">$70^\circ + a + 40^\circ = 180^\circ$ ✓M</td> <td data-bbox="633 723 1072 768">sum int \angles of $\triangle ACE$ /som binne \anglee van $\triangle ACE$ ✓A</td> </tr> <tr> <td data-bbox="229 768 628 884">$a = 70^\circ$ ✓CA</td> <td data-bbox="633 768 1072 884"></td> </tr> </tbody> </table>	Statement / Bewering	Reason / Rede	$70^\circ + a + 40^\circ = 180^\circ$ ✓M	sum int \angle s of $\triangle ACE$ /som binne \angle e van $\triangle ACE$ ✓A	$a = 70^\circ$ ✓CA		<p>1 mark for statement / 1 punt vir bewering 1 mark for reason / 1 punt vir rede 1 mark for answer / 1 punt vir antwoord</p>						
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8.1.3	<table border="1"> <thead> <tr> <th data-bbox="229 969 628 1014">Statement / Bewering</th> <th data-bbox="633 969 1072 1014">Reason / Rede</th> </tr> </thead> <tbody> <tr> <td data-bbox="229 1014 628 1142">$\triangle BCD$ is an isosceles triangle / gelykbenige driehoek ✓A</td> <td data-bbox="633 1014 1072 1142">\angles opposite equal sides are equal / teenoorstaande gelykesye is gelyk ✓A</td> </tr> </tbody> </table>	Statement / Bewering	Reason / Rede	$\triangle BCD$ is an isosceles triangle / gelykbenige driehoek ✓A	\angle s opposite equal sides are equal / teenoorstaande gelykesye is gelyk ✓A	<p>1 mark for statement / punt vir bewering 1 mark for reason / punt vir rede</p>								
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8.2	<table border="1"> <thead> <tr> <th data-bbox="229 1193 571 1238">Statement / Bewering</th> <th data-bbox="576 1193 1072 1238">Reason / Rede</th> </tr> </thead> <tbody> <tr> <td data-bbox="229 1238 571 1321">In $\triangle ABC$ and $\triangle CDA$:</td> <td data-bbox="576 1238 1072 1321"></td> </tr> <tr> <td data-bbox="229 1321 571 1388">$AB = DC$</td> <td data-bbox="576 1321 1072 1388">Given / Gegee ✓</td> </tr> <tr> <td data-bbox="229 1388 571 1456">$AC = AC$</td> <td data-bbox="576 1388 1072 1456">Common side / Gemeenskaplike sy ✓</td> </tr> <tr> <td data-bbox="229 1456 571 1523">$\hat{A}_1 = \hat{C}_1$ ✓</td> <td data-bbox="576 1456 1072 1523">alt \angles and $AB \parallel DC$ / verw. \anglee en $AB \parallel DC$ ✓</td> </tr> <tr> <td data-bbox="229 1523 571 1590">$\triangle ABC \equiv \triangle CDA$</td> <td data-bbox="576 1523 1072 1590">s\angles ✓</td> </tr> </tbody> </table>	Statement / Bewering	Reason / Rede	In $\triangle ABC$ and $\triangle CDA$:		$AB = DC$	Given / Gegee ✓	$AC = AC$	Common side / Gemeenskaplike sy ✓	$\hat{A}_1 = \hat{C}_1$ ✓	alt \angle s and $AB \parallel DC$ / verw. \angle e en $AB \parallel DC$ ✓	$\triangle ABC \equiv \triangle CDA$	s \angle s ✓	<p>1 mark for statement and reason / punt vir bewering en rede 1 mark for statement and reason / punt vir bewering en rede 1 mark for statement / punt vir bewering 1 mark for reason / punt vir rede 1 mark for statement and reason / punt vir bewering en rede</p>
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8.3	Statement / Bewering	Reason / Rede	1 mark for statement and reason / 1 punt vir bewering en rede 1 mark for statement and reason / 1 punt vir bewering en rede 1 mark for statement and reason / 1 punt vir bewering en rede 1 mark for reason / 1 punt vir rede
	In $\triangle CFB$ and $\triangle DFE$:		
	$\hat{C} = \hat{D} = 40^\circ$	given / gegee ✓ A	
	$\hat{F}_1 = \hat{F}_2$	vert. opp. \angle s ✓	
	$\hat{B}_2 = \hat{E}_2$	sum int \angle s of \triangle / som binne \angle e van \triangle ✓ A	
	$\therefore \triangle CFB \parallel \triangle DFE$	$\angle\angle\angle$ ✓	

8.4	8.4.1	Construction / Konstruksie		1 mark for correct labeling of triangle / 1 punt vir korrekte benoeming van driehoek 1 mark for accurate measurement of sides / 1 punt vir akkurate meting van sye 1 mark for accurate measurement of $\hat{A} = 65^\circ$ angle / 1 punt vir akkurate meting van $\hat{A} = 65^\circ$
	8.4.2	$\hat{A} = 50^\circ$ ✓ CA	1 mark for accurate measurement of angle / 1 punt vir akkurate meting van hoek	
8.5	$H'(0; 2)$ ✓ A		1 mark for each co-ordinate / 1 punt vir elk korekte kordinate	
			[22]	

QUESTION / VRAAG 9

9.1	<table border="1"> <thead> <tr> <th data-bbox="204 416 604 477">Statement / Bewering</th> <th data-bbox="604 416 1053 477">Reason / Rede</th> </tr> </thead> <tbody> <tr> <td data-bbox="204 477 604 544">In ΔYTZ</td> <td data-bbox="604 477 1053 544"></td> </tr> <tr> <td data-bbox="204 544 604 618">$YT = 13 \checkmark \mathbf{A}$</td> <td data-bbox="604 544 1053 618">Opposite \angle of a rectangle / <i>Teenoorgestelde van 'n reghoek</i></td> </tr> <tr> <td data-bbox="204 618 604 694">$YZ^2 = YT^2 - TZ^2$</td> <td data-bbox="604 618 1053 694">Theorem of Pythagoras / <i>Stelling van Pythagoras</i></td> </tr> <tr> <td data-bbox="204 694 604 761">$= 13^2 - 5^2 \checkmark \mathbf{M}$</td> <td data-bbox="604 694 1053 761"></td> </tr> <tr> <td data-bbox="204 761 604 828">$= 169 - 25$</td> <td data-bbox="604 761 1053 828"></td> </tr> <tr> <td data-bbox="204 828 604 896">$= 144 \checkmark \mathbf{CA}$</td> <td data-bbox="604 828 1053 896"></td> </tr> <tr> <td data-bbox="204 896 604 963">$YZ = 12 \checkmark \mathbf{CA}$</td> <td data-bbox="604 896 1053 963"></td> </tr> </tbody> </table>		Statement / Bewering	Reason / Rede	In ΔYTZ		$YT = 13 \checkmark \mathbf{A}$	Opposite \angle of a rectangle / <i>Teenoorgestelde van 'n reghoek</i>	$YZ^2 = YT^2 - TZ^2$	Theorem of Pythagoras / <i>Stelling van Pythagoras</i>	$= 13^2 - 5^2 \checkmark \mathbf{M}$		$= 169 - 25$		$= 144 \checkmark \mathbf{CA}$		$YZ = 12 \checkmark \mathbf{CA}$		<p>1 mark for $YT = 13$ / <i>1 punt vir $YT = 13$</i> 1 mark for $YZ^2 = YT^2 - TZ^2$ / <i>1 punt vir $YZ^2 = YT^2 - TZ^2$</i> and substitution / <i>en substitusie</i> 1 mark for $YZ^2 = 144$ / <i>1 punt vir antwoord $YZ^2 = 144$</i> 1 mark for answer / <i>1 punt vir antwoord</i></p>
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9.2	9.2.1	$Area ABCD = AB \times BC$ or / of $AD \times DC \checkmark$	1 mark for formula / <i>punt vir formule</i>																
	9.2.2	$Area \Delta DEC = \frac{DC \times EF}{2}$ or / of $\frac{1}{2} \times DC \times EF \checkmark$	1 mark for formula / <i>punt formule</i>																
	9.2.3	$Area \parallel^m CDEG = DC \times EF$ or / of $EG \times BC \checkmark$	1 mark for formula / <i>punt formule</i>																
	9.2.4	$Area \text{ of / van } AECD = \frac{EF(AE + DC)}{2} \checkmark$	1 mark for formula / <i>punt formule</i>																
9.3	$SA = 2\pi r^2 + 2\pi r \times H \checkmark$ $= 2 \left(\frac{22}{7}\right) (7)^2 + 2 \left(\frac{22}{7}\right) (7) \times 12 \checkmark$ $= 308\text{cm}^2 + 528\text{cm}^2 \checkmark$ $SA = 836 \text{ cm}^2 \checkmark \mathbf{CA}$ or / of $SA = 2\pi r(r + h) \checkmark$ $= 2 \left(\frac{22}{7}\right) (7)(19)\text{cm}^2 \checkmark \checkmark$ $SA = 836 \text{ cm}^2 \checkmark \mathbf{CA}$		<p>1 mark for formula / <i>punt formule</i> 1 mark for correct substitution / <i>1 punt vir korrekte vervanging</i> 1 mark for calculation / <i>1 punt vir bewerking</i> 1 mark for answer / <i>1 punt vir antwoord.</i></p>																
			[13]																
TOTAL / TOTAAL			[100]																