



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE/
NASIONALE
SENIOR SERTIFIKAAT**

GRADE/GRAAD 10

MATHEMATICS P1/WISKUNDE V1

NOVEMBER 2017

MARKING GUIDELINES/NASIENRIGLYNE

MARKS/PUNTE: 100

**DEPARTMENT OF BASIC
EDUCATION**

PRIVATE BAG X895, PRETORIA 0001

2017 -11- 06

APPROVED MARKING GUIDELINE

PUBLIC EXAMINATION

**These marking guidelines consist of 12 pages.
Hierdie nasienriglyne bestaan uit 12 bladsye.**

NOTE:

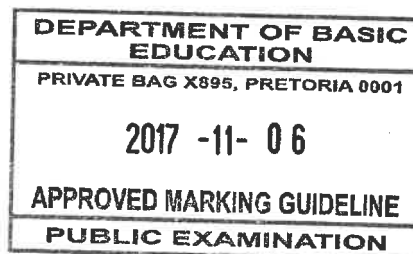
- If a candidate answered a question TWICE, mark only the FIRST attempt.
- If a candidate crossed out an answer and did not redo it, mark the crossed-out answer.
- Consistent accuracy applies to ALL aspects of the marking guidelines.
- Assuming values/answers in order to solve a problem is unacceptable.

LET WEL:

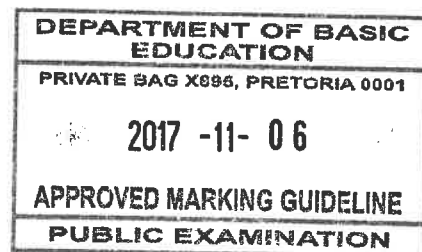
- As 'n kandidaat 'n vraag TWEE keer beantwoord het, sien slegs die EERSTE poging na.
- As 'n kandidaat 'n antwoord deurgehaal en nie oorgedoen het nie, sien die deurgehaalde antwoord na.
- Volgehoue akkuraatheid is op ALLE aspekte van die nasienriglyne van toepassing.
- Dit is onaanvaarbaar dat waardes/antwoorde veronderstel word om 'n probleem op te los.

QUESTION/VRAAG 1

1.1.1	$q = \sqrt{b^2 - 4ac}$ $q = \sqrt{(-1)^2 - 4(2 \times -4)}$ $q = \sqrt{33}$	✓ correct subst./korrek verv. ✓ answ/antw (2)
1.1.2	Irrational/Irrasionaal	✓ answ/antw (1)
1.1.3	5 and/en 6	✓ answ/antw (1)
1.2.1	$t^2(r-s) - r + s$ $= t^2(r-s) - (r-s)$ $= (r-s)(t^2 - 1)$ $= (r-s)(t-1)(t+1)$	✓ common factor/gemene faktor ✓ factors/faktore ✓ difference of two squares/ verskil van twee kwadrate (3)
1.2.2	$\frac{x^3 + 1}{x^2 - x + 1}$ $= \frac{(x+1)(x^2 - x + 1)}{x^2 - x + 1}$ $= x + 1$	factors of numerator: ✓ (x + 1) ✓ (x ² - x + 1) (2)

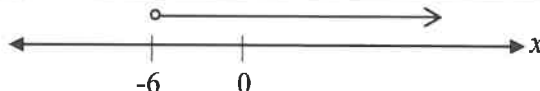


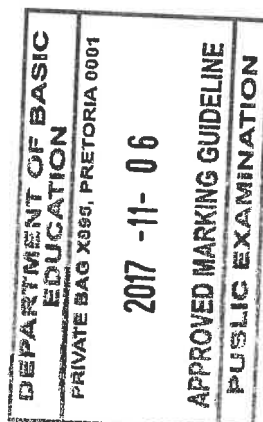

1.3.1	$(2y+3)(7y^2-6y-8)$ $= 14y^3 - 12y^2 - 16y + 21y^2 - 18y - 24$ $= 14y^3 + 9y^2 - 34y - 24$	✓ multiplying brackets/ <i>vermenigvuldig hakkies</i> ✓ answ/antw (2)
1.3.2	$\frac{3}{x^2-9} + \frac{2}{(x-3)^2}$ $= \frac{3}{3} + \frac{2}{(x-3)^2}$ $= \frac{(x-3)(x+3)}{3(x-3)+2(x+3)}$ $= \frac{(x-3)^2(x+3)}{3x-9+2x+6}$ $= \frac{(x-3)^2(x+3)}{5x-3}$ $= \frac{(x-3)^2(x+3)}{(x-3)^2(x+3)}$	✓ LCD/KGN ✓ $3(x-3)+2(x+3)$ ✓ answ/antw (3)
1.3.3	$\frac{3^t - 3^{t-2}}{2 \cdot 3^t - 3^t}$ $= \frac{3^t(1-3^{-2})}{3^t(2-1)}$ $= \frac{1-\frac{1}{9}}{1}$ $= \frac{8}{9}$	✓ factors/ <i>faktore</i> ✓ simpl./ <i>vereenv</i> ✓ answ/antw (3)
		[17]



Q *LD* *Mes*

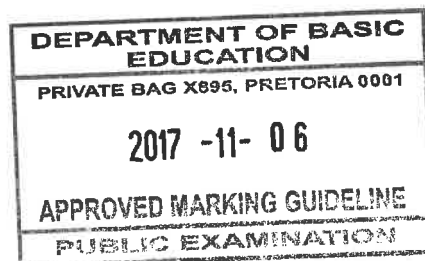
QUESTION/VRAAG 2

2.1.1	$4 - 2x < 16$ $-2x < 12$ $x > -6$ <p style="text-align: center;">OR / OF</p> $4 - 2x < 16$ $-12 < 2x$ $-6 < x$	✓ simpl./vereenv ✓ answ/antw (2)
2.1.2		✓ answ/antw (1)
2.2	$3x - 4y = -4 \dots\dots\dots(1)$ $-2x - y = 10 \dots\dots\dots(2)$ $3x - 4y = -4 \dots\dots\dots(1)$ $(2) \times -4 : 8x + 4y = -40 \dots\dots\dots(3)$ $(1) + (3) : 11x = -44$ $x = -4$ <p>substitute $x = -4$ into (2)</p> $-2(-4) - y = 10$ $y = -2$ <p>OR/OF</p> $3x - 4y = -4 \dots\dots\dots(1)$ $-2x - y = 10 \dots\dots\dots(2)$ $(1) \times 2 : 6x - 8y = -8 \dots\dots\dots(3)$ $(2) \times 3 : -6x - 3y = 30 \dots\dots\dots(4)$ $(3) + (4) : -11y = 22$ $y = -2$ <p>substitute $y = -2$ into (2)</p> $-2x - (-2) = 10$ $2x = -8$ $x = -4$ <p>OR/OF</p> <p>From(2): $y = -2x - 10 \dots\dots\dots(3)$</p> <p>subst.(3) into (1) : $3x - 4(-2x - 10) = -4$</p> $3x + 8x + 40 = -4$ $11x = -44$ $x = -4$ <p>subst. $x = -4$ into (3) : $y = -2(-4) - 10$</p> $y = -2$	✓ multipl/maal (2) by/met 4 ✓ adding/tel op (1) & (3) ✓ x-value/waarde (4) ✓ y-value/waarde (4) <p>OR/OF</p> ✓ multipl/maal (1) by/met 2 and multipl/maal (2) by/met 3 ✓ adding/tel op (3) & (4) ✓ y-value/waarde (4) ✓ x-value/waarde (4) <p>OR/OF</p> ✓ equation/verg (3) ✓ subst./verv. (4) ✓ x-value/waarde (4) ✓ y-value/waarde (4)



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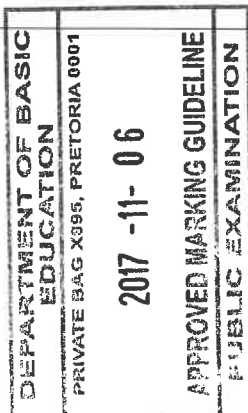
<p>2.3.1</p>	$\frac{x(x-5)}{6} - 1 = 0$ $x^2 - 5x - 6 = 0$ $(x-6)(x+1) = 0$ $x = 6 \text{ or } x = -1$ <p>OR/OF</p> $\frac{x(x-5)}{6} - 1 = 0$ $\frac{x^2 - 5x - 6}{6} = 0$ $\frac{(x-6)(x+1)}{6} = 0$ $x - 6 = 0 \text{ or } x + 1 = 0$ $x = 6 \text{ or } x = -1$	<p>✓ stand. form/-vorm</p> <p>✓ factors/faktore</p> <p>✓ answ/antw</p> <p>(3)</p> <p>OR/OF</p> <p>✓ stand. form/-vorm</p> <p>✓ factors/faktore</p> <p>✓ answ/antw</p> <p>(3)</p>
<p>2.3.2</p>	$c = \sqrt{a+2x}$ $c^2 = a+2x$ $2x = c^2 - a$ $x = \frac{c^2 - a}{2}$	<p>✓ squaring both sides/kwadreer beide kante</p> <p>✓ answ/antw</p> <p>(2)</p>
<p>2.4</p>	<p>Let Linda's age now be x/Laat Linda se ouderdom nou x wees</p> <p>Therefore Tabelo's age is $4x$/Dus is Tabelo se ouderdom $4x$</p> <p>6 years/jaar later: Linda's age will be: <i>Linda se ouderdom sal wees:</i> $x + 6$ Tabelo's age will be: <i>Tabelo se ouderdom sal wees:</i> $4x + 6$</p> $4x + 6 = 3(x + 6)$ $4x - 3x = 18 - 6$ $x = 12$ <p>Linda's age/Linda se ouderdom is 12 years/jaar</p>	<p>✓ $4x$</p> <p>✓ $x + 6$</p> <p>✓ equating/verg.</p> <p>✓ answ/antw</p> <p>(4)</p>
<p>[16]</p>		



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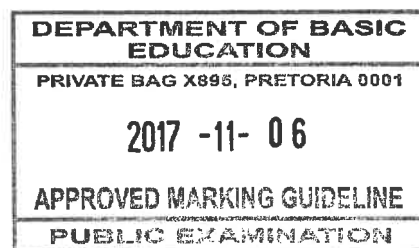
QUESTION/VRAAG 3



3.1.1	constant difference = 3 $b = 14$	✓ constant diff/konstante verskil = 3 ✓ answ/antw (2)
3.1.2	The sequence is linear/Hierdie ry is lineêr: $T_n = pn + q$. $T_n = 3n + q$ $T_n = 3n + 2$	✓ 3n ✓ 2 (2)
3.1.3	$T_n = 3n + 2$ $T_{15} = 3(15) + 2$ $T_{15} = 47$	✓ subst./verv. ✓ answ/antw (2)
3.1.4	$T_n = 3n + 2$ $83 = 3n + 2$ $3n = 81$ $n = 27$	✓ $T_n = 83$ ✓ answ/antw (2)
3.2.1	Sum of the terms in rows/Som van terme in ry: 2 ; 16 ; 54 ; 128 ; Row/Ry 1: $2 \times 1 = 2$ Row/Ry 2 : $2 \times 8 = 16$ Row/Ry 3 : $2 \times 27 = 54$ Row/Ry 4 : $2 \times 64 = 128$. . Row/Ry n : $2n^3$ Row/Ry 8 = $2(8)^3 = 1024$ OR/OF Pattern for the first terms in rows/Patroon van die eerste terme in rye: 2; 6; 14 ; 26 ; ... $2 ; 4(1)+2 ; 4(1)+4(2)+2 ; 4(1)+4(2)+4(3)+2 ; \dots$ $T_8 = 4(1 + 2 + 3 + 4 + 5 + 6 + 7) + 2$ $= 114$ Sum of the terms in row 8/Som van terme in ry 8 $= 114 + 118 + 122 + 136 + 130 + 134 + 138 + 142$ $= 1024$	✓ gen./alg. term ✓ subst./verv. ✓ answ/antw (3) OR/OF ✓ $T_8 = 114$ ✓ sum of terms in row/som van terme in ry 8 ✓ answ/antw (3)



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3.2.2	<p>Mean in row/Gemiddeld in ry 20 = $\frac{2(20)^3}{20} = 800$</p> <p>OR/OF</p> <p>First term of row/Eerste term in ry 20: $T_{20} = 4(1 + 2 + 3 + 4 + \dots + 19) + 2$ $= 762$</p> <p>Sum of terms in row/Som van terme in ry 20 $= 762 + 766 + 770 + \dots + 838.$ $= 16000$</p> <p>\therefore Mean/Gemiddeld = $\frac{16000}{20} = 800$</p>	<p>✓ subst./verv. ✓ answ/antw</p> <p>(2)</p> <p>OR/OF</p> <p>✓ 16 000 ✓ answ/antw</p> <p>(2)</p>
[13]		



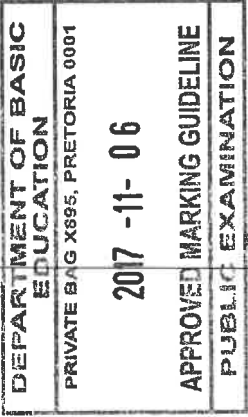
QUESTION/VRAAG 4

<p>4.1.1</p>	$A = P(1 + i.n)$ $= 18000(1 + 0,045 \times 7)$ $= R23670$ <p>Interest/Rente = 23670 – 18000</p> $= R5670$ <p>OR/OF</p> $SI = \frac{Prt}{100}$ $= \frac{18000 \times 4,5 \times 7}{100}$ $= R5670,00$	<p>✓ R23 670</p> <p>✓ R5 670</p> <p>OR/OF</p> <p>✓ subst./very.</p> <p>✓ answ/antw</p> <p>(2)</p>
<p>4.1.2</p>	$A = P(1 + i)^n$ $R27660 = P(1 + 0,067)^5$ $P = \frac{27660}{(1 + 0,067)^5}$ $P = R20000$	<p>✓ correct subst./korrek very. in correct formula/ korrekte formule</p> <p>✓ making P the subject/maak P onderwerp van foemule</p> <p>✓ answ/antw</p> <p>(3)</p>
<p>4.1.3</p>	$A = P(1 + i.n)$ $27660 = 18000(1 + i \times 7)$ $7i = \frac{27660}{18000} - 1$ $i = \frac{\frac{27660}{18000} - 1}{7}$ $i = 0,07666....$ <p>Simple interest rate should have been/ Eenvoudige rente moes wees 7,67%</p>	<p>✓ correct subst./korrek very. in correct formula/in korrekte formule</p> <p>✓ making i the subject/maak i onderwerp van formule</p> <p>✓ answ/antw as %</p> <p>(3)</p>
<p>4.2</p>	$\frac{\text{Pound/Pond}}{\text{Dollar}} = \frac{R16,52}{R12,91}$ <p>∴ £1 ≈ \$1,28</p> <p>OR/OF</p> $\frac{\text{Dollar}}{\text{Pound/Pond}} = \frac{R12,91}{R16,52}$ <p>∴</p>	<p>✓ proportion/verhouding</p> <p>✓ £1 ≈ \$1,28</p> <p>OR/OF</p> <p>✓ proportion/verhouding</p> <p>✓ \$1 ≈ £0,78</p> <p>(2)</p>
		<p>[10]</p>

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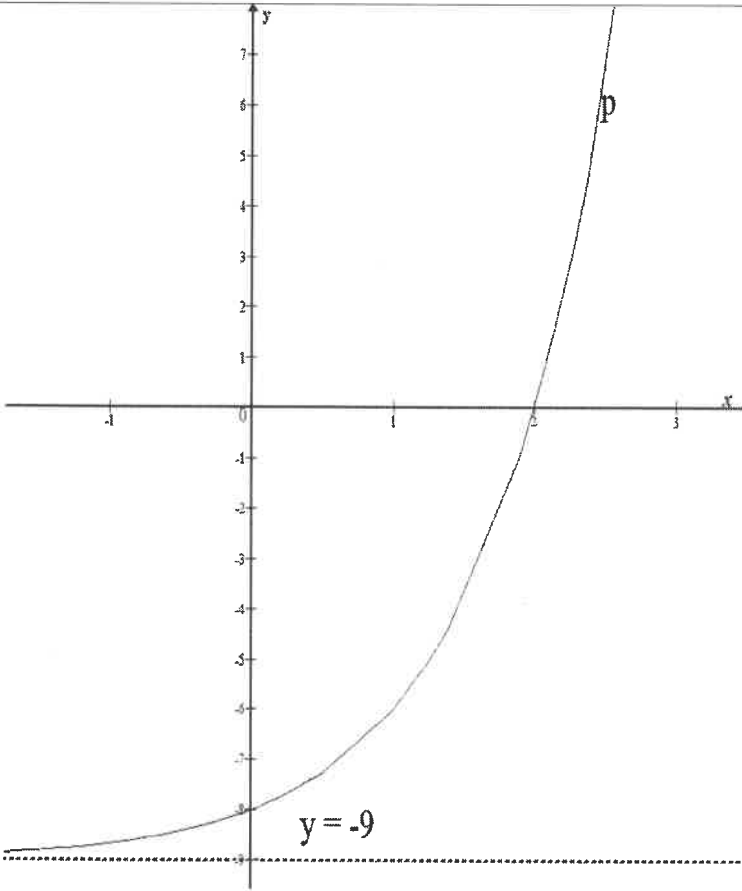
QUESTION/VRAAG 5

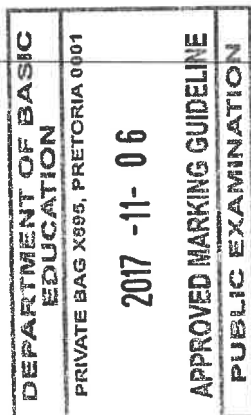
<p>5.1</p>	<p>Range of/Waardeversameling van $g : y \leq 8$ OR/OF $y \in (-\infty; 8]$</p>	<p>✓ answ/antw (1) OR/OF ✓ answ/antw (1)</p>
<p>5.2</p>	<p>The x-coordinate of R is -2</p>	<p>✓ answ/antw (1)</p>
<p>5.3</p>	<p>$g(x) = ax^2 + 8 \Rightarrow q = 8$ $g(2) = a(2)^2 + 8 = 0$ $\Rightarrow a = -2$ OR/OF $g(x) = ax^2 + 8 \Rightarrow q = 8$ $g(-2) = a(-2)^2 + 8 = 0$ $\Rightarrow a = -2$</p>	<p>✓ $q = 8$ ✓ subst./verv. $(2; 0)$ ✓ $a = -2$ (3) OR/OF ✓ $q = 8$ ✓ subst./verv. $(-2; 0)$ ✓ $a = -2$ (3)</p>
<p>5.4</p>	<p>$f(x) = mx + c \Rightarrow c = 8$ $f(-2) = -2m + 8 = 0$ $\Rightarrow m = 4$ $f(x) = 4x + 8$</p>	<p>✓ $c = 8$ ✓ $m = 4$ ✓ equation / vergelyking (3)</p>
<p>5.5.1</p>	<p>$x = -2$ or $x = 0$</p>	<p>✓ $x = -2$ ✓ $x = 0$ (2)</p>
<p>5.5.2</p>	<p>$x \cdot g(x) \leq 0$ $-2 \leq x \leq 0$ or $x \geq 2$ OR/OF $x \in [-2; 0]$ or $x \in [2; \infty)$</p>	<p>✓ $-2 \leq x \leq 0$ ✓ $x \geq 2$ (3) OR/OF ✓ $[-2; 0]$ ✓ $[2; \infty)$ (3)</p>
<p>5.6</p>	<p>$h(x) = -(-2x^2 + 8)$ $h(x) = 2x^2 - 8$</p>	<p>✓ $h(x) = -(g(x))$ ✓ $2x^2 - 8$ (2)</p>
		<p>[15]</p>



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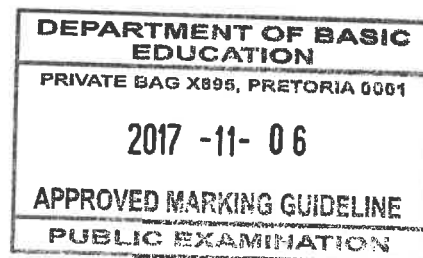
QUESTION/VRAAG 6

<p>6.1.1</p>	<p>The range/Waardeversameling $y > -9$ OR/OF $y \in (-9; \infty)$</p>	<p>✓ answ/antw (1) OR/OF ✓ answ/antw (1)</p>
<p>6.1.2</p>	<p>$p(x) = k^x + q$ $p(x) = k^x - 9$ $0 = k^2 - 9$ $k^2 = 9$ $k = \pm 3$ $k = 3$ since/omdat $k > 0$ $p(x) = 3^x - 9$</p>	<p>✓ $q = -9$ ✓ subst/verv. (2 ; 0) ✓ $k = 3$ (3)</p>
<p>6.1.3</p>		<p>✓ asymptote/asimptoot ✓ intercepts/afsnitte ✓ shape: increasing /vorm: stygend (3)</p>



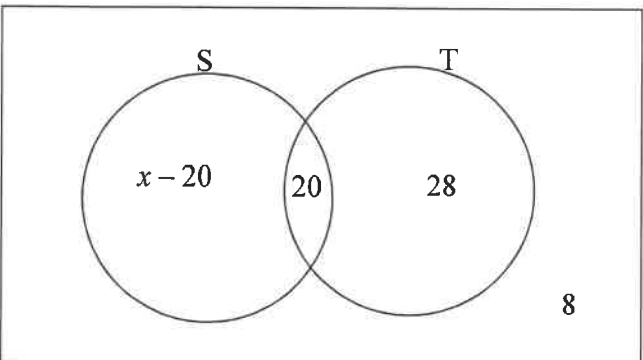
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6.2.1	$w = -1$	✓ answ/antw (1)
6.2.2	$f(x) = \frac{k}{x} - 1$ $7 = \frac{k}{-2} - 1$ $k = -16$	✓ subst./verv. (-2 ; 7) ✓ answ/antw (2)
6.2.3	$f(x) = g(x)$ $\frac{-16}{x} - 1 = -x - 1$ $x^2 - 16 = 0$ $(x - 4)(x + 4) = 0$ $x_Q = 4 \text{ or } x_P = -4$	✓ equating/verg. ✓ simpl./vereenv ✓ $x = -4$ at/by P ✓ $x = 4$ at Q (4)
6.2.4	$-4 < x < 0 \text{ or } x > 4$ OR/OF $x \in (-4 ; 0) \text{ or } x \in (4 ; \infty)$	✓ $-4 < x < 0$ ✓ $x > 4$ OR/OF ✓ $(-4 ; 0)$ ✓ $(4 ; \infty)$ (2)
		[16]



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QUESTION/VRAAG 7

7.1.1	$P(A) + P(B) = P(A \text{ or } B)$ OR/OF $P(A) + P(B) = 1$ OR/OF $P(A) + P(B) = P(S)$	✓ answ/antw OR /OF (1) ✓ answ/antw OR/OF (1) ✓ answ/antw (1)
7.1.2	$P(A \text{ and } B) = 0$	✓ answ/antw (1)
7.1.3	$P(B) = P(A')$ $= 0,35$	✓ answ/antw (1)
7.2.1		✓ 20 (in the intersection/in die snyding) ✓ 28 (in T only/slegs in T) ✓ $x - 20$ (in S only/slegs in S) ✓ 8 (outside/buite of S or/of T) (4)
7.2.2	$x - 20 + 20 + 28 + 8 = 150$ $x = 114$ Smartphone only/Slegs slimfoon = $114 - 20 = 94$	✓ equation/verg. ✓ value/waarde of/van x ✓ answ/antw (3)
7.2.3 (a)	$P(\text{S only/slegs}) = \frac{94}{150} = 0,63$	✓ answ/antw (1)
7.2.3 (b)	$P(\text{S or/of T or neither/of geeneen}) = \frac{94}{150} + \frac{28}{150} + \frac{8}{150}$ $= \frac{130}{150}$ $= \frac{13}{15}$ $= 0,87$ <p>OR/OF</p> $P(\text{S or/of T or neither/of geeneen}) = 1 - \frac{20}{150}$ $= \frac{13}{15}$ $= 0,87$	✓ addition/optel ✓ answ/antw (2) OR/OF ✓ complementary rule/komplementêre reël ✓ answ/antw (2)
		[13]

TOTAL/TOTAAL: 100

 M.S

NOVEMBER 2017
GRADE 10 MATHEMATICS PAPER 1
ADDITIONAL NOTES TO MEMORANDUM

NOTE:

- If a candidate answers a question TWICE, only mark the FIRST attempt.
- Consistent accuracy applies in ALL aspects of the marking memorandum.

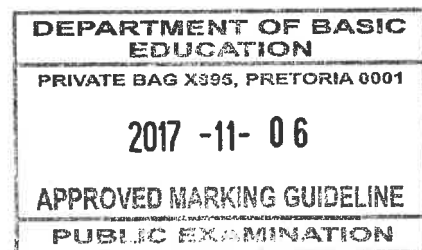
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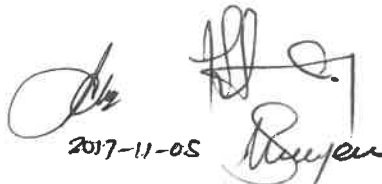
- Indien 'n kandidaat 'n vraag TWEE keer beantwoord, sien slegs die EERSTE poging na.
- Volgehoue akkuraatheid is op ALLE aspekte van die memorandum van toepassing.

ONCE A CANDIDATE HAS REACHED 2 ERRORS RELATED TO MARKS: STOP MARKING.

QUESTION/VRAAG 1

1.1.1	Answer only: 2/2 marks
1.1.2	CA from 1.1.1 If the candidate states irrational but not consistent with 1.1.1, then 0 marks.
1.1.3	CA from 1.1.1
1.2.1	$t^2(r-s) - r + s$ $= t^2(r-s) - (r+s) \quad : \text{BD} \quad 0/3\text{marks}$ $t^2(r-s) - r + s$ $= t^2(r-s) + (r-s) \quad : \text{CA on removing common factor } 1/3\text{marks}$ $= (r-s)(t^2 + 1)$ $=$
1.3.2	CA on numerator according to LCD
1.3.3	No penalty for using calculator to simplify exponents




 2017-11-05

QUESTION/VRAAG 2

2.1.1	$4 - 2x < 16$ $2x < 12$: BD 0/2 marks $x < 6$
2.1.2	CA from 2.1.1
2.3.1	$\frac{x(x-5)}{6} - 1 = 0$ $\frac{x^2 - 5x - 6}{6} = 0$ $\frac{(x-6)(x+1)}{6} = 0$ $\frac{x-6}{6} = 0$ or $\frac{x+1}{6} = 0$ $x = 6$ or $x = -1$ <p>Although the answer is correct, there is a breakdown in the working. Award 2/3 marks</p> <p>Similarly, if the working is shown as above and the answers are $x = 1$ or $x = -\frac{1}{6}$, we cannot award a CA mark for the answers. Award 2/3 marks.</p>
2.4	<ul style="list-style-type: none"> Solving by Trial and error with working shown: 4/4 marks Answer only (no working shown) : 1/4 marks $x + 6 = 3(4x + 6)$ shows a misunderstanding of the situation. Further, this results in $x = -\frac{12}{11}$. Award 2/4 marks

QUESTION/VRAAG 3

3.1.1	Answer only: 2/2 marks
3.1.2	CA only if constant difference from 3.1.1 is used.
3.1.3	CA only if 3.1.2 is linear
3.1.4	<ul style="list-style-type: none"> CA only if 3.1.2 is linear CA on answer only if positive integer solution. If negative or fraction solution, then no CA mark.
3.2.1	<p>Answer only: 1/3 marks</p> <p>Accept the use of quadratic number pattern theory in obtaining first term of 8th row.</p>
3.2.2	<ul style="list-style-type: none"> CA from 3.2.1 applies for the formula in the numerator No CA for answer if any random number is divided by 20.

2017 -11- 06

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PUBLIC EXAMINATION**QUESTION/VRAAG 4**

4.1.2	No marks if incorrect formula is used
4.1.3	No penalty for incorrect rounding No marks if incorrect formula is used
4.2	Penalise 1 mark for incorrect rounding. Answer only $\text{£}1 \approx \$1,28$ or $\text{£}1 \approx \text{€}0,78$: 2/2 marks

QUESTION/VRAAG 5

5.1	Accept $(-\infty; 8]$
5.2	Accept $R(-2; 0)$. No marks for any other coordinates.
5.4	CA from 5.2 applies in calculating the value of m .
5.5.1	<ul style="list-style-type: none"> CA from 5.2 Accept as correct $(-2; 0)$ and $(0; 8)$ Solution by calculation is acceptable
5.5.2	<ul style="list-style-type: none"> CA from 5.2 Accept $[-2; 0]$ or $[2; \infty)$ No part marks awarded for $-2 \leq x \leq 0$. Either 2 marks for correct answer or 0.
5.6	<ul style="list-style-type: none"> Answer only 2/2marks Both p and k must be correct to award 2 marks. No part marks to be allocated. CA from 5.3 only if $p > 0$ and $k < 0$.

QUESTION/VRAAG 6

6.1.1	Accept $(-9; \infty)$
6.1.3	<ul style="list-style-type: none"> If candidates draw a straight line or a parabola through the correct intercepts, award 1/3 marks. If only the intercepts are shown and no graph drawn, award 0/3.
6.2.2	CA on k only if $k < 0$.
6.2.3	<ul style="list-style-type: none"> CA from 6.2.2 CA on values for x only if one positive answer and one negative answer If P and Q not specified, max 3/4 marks. Answer only 1/4 marks
6.2.4	<ul style="list-style-type: none"> CA from 6.2.3. Accept $(-4; 0)$ or $(4; \infty)$ No part marks awarded for $-4 < x < 0$. Either 2 marks for correct answer or 0.

QUESTION/VRAAG 7

7.2.3	<ul style="list-style-type: none"> CA from 7.2.2. No marks for probabilities that are less than 0 or greater than 1.
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