SENIOR CERTIFICATE EXAMNATIONS
SENIORSERTIFIKAAT-EKSAMEN

MATHEMATICS P1/*WISKUNDE V1*

2017

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS: 150
PUNTE: 150

These marking guidelines consist of 20 pages.
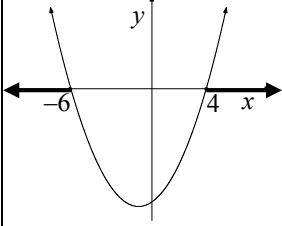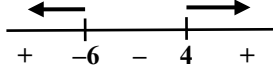*Hierdie nasienriglyne bestaan uit 20 bladsye.*

NOTE:
- If a candidate answers a question TWICE, only mark the FIRST attempt.
- Consistent Accuracy applies in all aspects of the marking memorandum.

LET WEL:
- *Indien 'n kandidaat 'n vraag TWEE keer beantwoord, merk slegs die EERSTE poging.*
- *Volgehoue akkuraatheid is DEURGAANS op ALLE aspekte van die memorandum van toepassing.*

QUESTION/*VRAAG* 1

1.1.1	$3x^2 + 10x + 6 = 0$ $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$ $$= \frac{-10 \pm \sqrt{(10)^2 - 4(3)(6)}}{2(3)}$$ $$x = -2{,}55 \quad \text{or} \quad x = -0{,}78$$ **OR/OF** $$x^2 + \frac{10}{3}x + \frac{100}{36} = -2 + \frac{100}{36}$$ $$\left(x + \frac{5}{3}\right)^2 = \frac{7}{9}$$ $$x + \frac{5}{3} = \pm\frac{\sqrt{7}}{3}$$ $$x = \frac{-5 \pm \sqrt{7}}{3}$$ $$x = -0{,}78 \quad \text{or} \quad x = -2{,}55$$	✓ substitution into correct formula ✓ $x = -2{,}55$ ✓ $x = -0{,}78$ **(3)** ✓ for adding $\frac{100}{36}$ on both sides ✓ $x = -2{,}55$ ✓ $x = -0{,}78$ **(3)**
1.1.2	$$\sqrt{6x^2 - 15} = x + 1$$ $$6x^2 - 15 = (x+1)^2$$ $$6x^2 - 15 = x^2 + 2x + 1$$ $$5x^2 - 2x - 16 = 0$$ $$(5x+8)(x-2) = 0$$ $$x = -\frac{8}{5} \quad \text{or} \quad x = 2$$ $$\therefore x = 2$$	✓ concept of squaring both sides ✓ standard form (accurate) ✓ factors ✓ both answers ✓ correct selection **(5)**

1.1.3	$x^2 + 2x - 24 \geq 0$	
	$(x+6)(x-4) \geq 0$	✓ factors
	OR	
	$x \leq -6$ or $x \geq 4$	✓✓ $x \leq -6$ or $x \geq 4$ (3)
1.2	$y = -5x + 3$	✓ y subject of formula
	$3x^2 - 2x(-5x+3) = (-5x+3)^2 - 105$	✓ substitution
	$3x^2 + 10x^2 - 6x = 25x^2 - 30x + 9 - 105$	✓ simplification
	$-12x^2 + 24x + 96 = 0$	
	$x^2 - 2x - 8 = 0$	
	$(x-4)(x+2) = 0$	✓ factors
	$x = -2$ or $x = 4$	✓ values of x
	$y = 13$ or $y = -17$	✓ values of y (6)
	OR/OF	
	$x = \dfrac{3-y}{5}$	✓ x subject of formula
	$3\left(\dfrac{3-y}{5}\right)^2 - 2y\left(\dfrac{3-y}{5}\right) = y^2 - 105$	✓ substitution
	$3\left(\dfrac{9-6y+y^2}{25}\right) - 2y\left(\dfrac{3-y}{5}\right) = y^2 - 105$	
	$27 - 18y + 3y^2 - 30y + 10y^2 = 25y^2 - 2625$	✓ simplification
	$12y^2 + 48y - 2652 = 0$	
	$y^2 + 4y - 221 = 0$	
	$(y-13)(y+17) = 0$	✓ factors
	$y = -17$ or $y = 13$	✓ values of y
	$x = \dfrac{3+17}{5}$ or $x = \dfrac{3-13}{5}$	
	$x = 4$ or $x = -2$	✓ values of x (6)
1.3.1	$p^2 - 48p - 49 = 0$	
	$(p-49)(p+1) = 0$	✓ factors
	$p = -1$ or $p = 49$	✓ $p = -1$ ✓ $p = 49$ (3)
1.3.2	$7^x = -1$ or $7^x = 49$	✓ $7^x = -1$ or $7^x = 49$
	no solution $\quad x = 2$	✓ no solution ✓ $x = 2$ (3)
		[23]

QUESTION/*VRAAG* 2

2.1.1	3; 2; k; ... $r = \dfrac{2}{3}$	✓ $r = \dfrac{2}{3}$ / 0,67 (1)
2.1.2	$r = \dfrac{T_3}{T_2}$ $T_3 = r \times T_2$ $= \dfrac{2}{3} \times 2$ $= \dfrac{4}{3}$ Thus $k = \dfrac{4}{3}$	✓ $\dfrac{2}{3} \times 2$ ✓ $\dfrac{4}{3}$ / 1,34 (2)
2.1.3	$T_n = a.r^{n-1}$ $\dfrac{128}{729} = 3 \times \left(\dfrac{2}{3}\right)^{n-1}$ $\left(\dfrac{2}{3}\right)^{n-1} = \dfrac{128}{2187}$ $\left(\dfrac{2}{3}\right)^{n-1} = \left(\dfrac{2}{3}\right)^{7}$ $n - 1 = 7$ $n = 8$ **OR / OF** $T_n = a.r^{n-1}$ $\dfrac{128}{729} = 3 \times \left(\dfrac{2}{3}\right)^{n-1}$ $\left(\dfrac{2}{3}\right)^{n-1} = \dfrac{128}{2187}$ $n - 1 = \log_{\frac{2}{3}} \dfrac{128}{2189}$ $n - 1 = 7$ $n = 8$	✓ $\dfrac{128}{729} = 3 \times \left(\dfrac{2}{3}\right)^{n-1}$ ✓ $\left(\dfrac{2}{3}\right)^{n-1} = \dfrac{128}{2187}$ ✓ $\left(\dfrac{2}{3}\right)^{7}$ ✓ answer **OR / OF** ✓ $\dfrac{128}{729} = 3 \times \left(\dfrac{2}{3}\right)^{n-1}$ ✓ $\left(\dfrac{2}{3}\right)^{n-1} = \dfrac{128}{2187}$ ✓ $n - 1 = \log_{\frac{2}{3}} \dfrac{128}{2189}$ ✓ answer (4)
2.2.1	$T_n = a + (n-1)d$ $T_{18} = 100 + (18-1)(150)$ $= R\ 2\ 650$	✓ substitution of n, a and d into AS ✓ 2 650 (2)

2.2.2	$$S_n = \frac{n}{2}[2a + (n-1)d]$$ $$30\,500 = \frac{n}{2}[2(100) + (n-1)(150)]$$ $$61\,000 = n(150n + 50)$$ $$61\,000 = 150n^2 + 50n$$ $$3n^2 + n - 1\,220 = 0$$ $$(3n + 61)(n - 20) = 0$$ $$n = -\frac{61}{3} \text{ or } n = 20$$ $$\text{N/A}$$ $$x = 100 + (20 - 1)(150)$$ $$= R\,2\,950$$	✓substitute 30 500, a and d into sum formula for AS ✓ simplification ✓ factors or quad formula ✓ $n = 20$ ✓ substitution T_n of AS ✓ 2 950 (6) **[15]**

QUESTION/*VRAAG* 3

3.1	First differences: 17; 15 Second difference: –2 $$T_n = an^2 + bn + c$$ $$a = \frac{\text{second difference}}{2} = \frac{-2}{2} = -1$$ $$3a + b = 17$$ $$3(-1) + b = 17$$ $$b = 20$$ $$a + b + c = 0$$ $$-1 + 20 + c = 0$$ $$c = -19$$ $$T_n = -n^2 + 20n - 19$$ **OR / OF** First differences: 17; 15 $$T_n = T_1 + (n-1)d_1 + \frac{(n-1)(n-2)}{2}d_2$$ $$= (0) + (n-1)(17) + \frac{(n-1)(n-2)}{2}(-2)$$ $$= 17n - 17 - n^2 + 3n - 2$$ $$= -n^2 + 20n - 19$$	✓17; 15 ✓ value of a ✓ value of b ✓value of c ✓17; 15 ✓value of a ✓ value of b ✓value of c (4)

3.2	$56 = -n^2 + 20n - 19$ $n^2 - 20n + 75 = 0$ $(n-15)(n-5) = 0$ $n = 5$ or $n = 15$	✓ $T_n = 56$ ✓ factors ✓ both answers (3)

3.3	$\sum\limits_{n=5}^{10} T_n - \sum\limits_{n=11}^{15} T_n$
	 $= T_5 + T_6 + T_7 + T_8 + T_9 + T_{10} - T_{11} - T_{12} - T_{13} - T_{14} - T_{15}$
	 $= (T_5 - T_{15}) + (T_6 - T_{14}) + \ldots + (T_9 - T_{13}) + T_{10}$
	 $= T_{10}$
	 because by symmetry $T_5 = T_{15}$; $T_6 = T_{14}$ ....
	
	 $T_{10} = -(10)^2 + 20(10) - 19$
	      $= 81$
	
	 OR/*OF*
	
	       T_5 T_{10} T_{15}
	 0; 17; 32; 45; 56; 65; 72; 77; 80; 81; 80; 77; 72; 65; 56
	
	 Hence,
	 $\sum\limits_{n=5}^{10} T_n - \sum\limits_{n=11}^{15} T_n$
	 $= (56 + 65 + 72 + 77 + 80 + 81) - (80 + 77 + 72 + 65 + 56)$
	 $= 81$
		✓✓ symmetry of terms
		
		 ✓ T_{10}
		 ✓ 81
		 (4)
		
		 ✓ writing out the symmetry of terms
		
		 ✓
		 $56 + 65 + 72 + 77 + 80 + 81$
		 ✓
		 $80 + 77 + 72 + 65 + 56$
		 ✓ 81
		 (4)
		 [11]

QUESTION/*VRAAG* 4

4.1	A (4; 3)	✓(4; 3) (1)
4.2	$y = \dfrac{6}{-4} + 3$ $= \dfrac{3}{2}$ $B\left(0 ; \dfrac{3}{2}\right)$	✓ $x = 0$ ✓ $y = \dfrac{3}{2}$ (2)
4.3	$0 = \dfrac{6}{x-4} + 3$ $-3 = \dfrac{6}{x-4}$ $-3(x-4) = 6$ $-3x + 12 = 6$ $x = 2$ C(2 ; 0)	✓ $y = 0$ ✓ $x = 2$ (2)
4.4	Average gradient $= \dfrac{0 - \dfrac{3}{2}}{2-0}$ $= -\dfrac{3}{4}$	✓ $\dfrac{0 - \dfrac{3}{2}}{2-0}$ ✓ $-\dfrac{3}{4}$ (2)
4.5	$y = -x + 7$ **OR/*OF*** $m = -1$ $\therefore y - 3 = -(x - 4)$ $y = -x + 7$	✓ $m = -1$ ✓ $y = -x + 7$ **OR/*OF*** ✓ $m = -1$ ✓ $y = -x + 7$ (2) **[9]**

QUESTION/*VRAAG* 5

5.1		f: ✓ *x*-intercepts ✓ *y*-intercept ✓ shape ✓ TP g: ✓ *x*-intercept and *y*-intercept ✓ shape (6)
5.2	$y = -20\dfrac{1}{4}$	✓✓ $y = -20\dfrac{1}{4}$ / $-\dfrac{81}{4}$ (2)
5.3	$-20\dfrac{1}{4} < k < -14$	✓ $-20\dfrac{1}{4} < k$ ✓ $k < -14$ (2)
5.4	Reflecting in the *x*-axis: $y = -2x + 14$ $y = -2(x + 7) + 14$ Shifting 7 units to the left: $= -2x - 14 + 14$ $\qquad\qquad\qquad\qquad = -2x$	✓ $y = -2x + 14$ ✓ $y = -2x$ (2) **[12]**

QUESTION/*VRAAG* 6

6.1	$f : y = b^x$ $f^{-1} : x = b^y$ $\quad\quad y = \log_b x$	✓ interchange x and y ✓ answer (2)
6.2	$y = x$	✓ answer (1)
6.3	P(0; 1)	✓ answer (1)
6.4	T(1; 0) $y = mx + c$ $y = -x + 1$	✓ coordinates of T ✓ $y = -x + 1$ (2)
6.5	At point R, PT and OR intersect: $-x + 1 = x$ $\quad 2x = 1$ $\quad\quad x = \dfrac{1}{2}$ $\quad\quad y = \dfrac{1}{2}$ Substitute $\left(\dfrac{1}{2}; \dfrac{1}{2}\right)$ into the equation of f: $y = b^x$ $\dfrac{1}{2} = b^{\frac{1}{2}}$ $b = \left(\dfrac{1}{2}\right)^2 = \dfrac{1}{4}$ **OR/*OF*** At point R, PT and OR intersect: $-x + 1 = x$ $\quad 2x = 1$ $\quad\quad x = \dfrac{1}{2}$ $\quad\quad y = \dfrac{1}{2}$ Substitute $\left(\dfrac{1}{2}; \dfrac{1}{2}\right)$ into the equation of g: $y = \log_b x$ $\dfrac{1}{2} = \log_b\left(\dfrac{1}{2}\right)$ $b^{\frac{1}{2}} = \dfrac{1}{2}$ $b = \left(\dfrac{1}{2}\right)^2 = \dfrac{1}{4}$	✓ $-x + 1 = x$ ✓ $x = \dfrac{1}{2}$ ✓ $y = \dfrac{1}{2}$ ✓ substitution ✓ $b = \dfrac{1}{4}$ (5) ✓ $-x + 1 = x$ ✓ $x = \dfrac{1}{2}$ ✓ $y = \dfrac{1}{2}$ ✓ substitution ✓ $b = \dfrac{1}{4}$ (5)
		[11]

QUESTION/*VRAAG* 7

7.1	$A = P(1-i)^n$ $331527 = 500000(1-i)^3$ $(1-i)^3 = \dfrac{331527}{500000}$ $1-i = \sqrt[3]{\dfrac{331527}{500000}}$ $i = 0,12800...$ $\quad = 12,8\%$	✓ substitution of A, P & n in correct formula ✓ $1-i = \sqrt[3]{\dfrac{331527}{500000}}$ or $1-i = \sqrt[3]{0,663054}$ ✓ answer (3)
7.2	$P = \dfrac{x\left[1-(1+i)^{-n}\right]}{i}$ $46\,000 = \dfrac{1900\left[1-\left(1+\dfrac{0,24}{12}\right)^{-n}\right]}{\dfrac{0,24}{12}}$ $\dfrac{46}{95} = 1-\left(1+\dfrac{0,24}{12}\right)^{-n}$ $\left(1+\dfrac{0,24}{12}\right)^{-n} = \dfrac{49}{95}$ $n = -\log_{\left(1+\frac{0,24}{12}\right)}\dfrac{49}{95}$ OR/*OF* $-n\log\left(1+\dfrac{0,24}{12}\right) = \log\dfrac{49}{95}$ $\quad = 33,43276544...$ months It will take him 34 months to pay back the loan.	✓ $i = \dfrac{0,24}{12}/0,02/\dfrac{1}{50}$ ✓ substitution of P , x and i in correct formula ✓ 33,43 ✓ answer (4)
7.3	$F = \dfrac{x[(1+i)^n - 1]}{i}$ $= \dfrac{3500\left[\left(1+\dfrac{0,075}{4}\right)^{4\times6,5} - 1\right]}{\dfrac{0,075}{4}}$ $= R\,115\,902,69$ $A = P(1+i)^n$ $= 115\,902,69\left(1+\dfrac{0,075}{4}\right)^{4\times3,5}$ $= R\,150\,328,12$	✓ $i = \dfrac{0,075}{4}/0,01875$ ✓ $n = 4 \times 6,5 = 26$ ✓ substitution into correct formula ✓ 115 902,69 ✓ substitution into correct formula ✓ 150 328,12 (6) **[13]**

QUESTION/*VRAAG* 8

8.1		
	$f(x+h) = 3 - 2(x+h)^2$	
	$\qquad\quad = 3 - 2x^2 - 4xh - 2h^2$	
	$f(x+h) - f(x) = 3 - 2x^2 - 4xh - 2h^2 - 3 + 2x^2$	$\checkmark 3 - 2x^2 - 4xh - 2h^2$
	$\qquad\qquad\quad = -4xh - 2h^2$	$\checkmark -4xh - 2h^2$
	$f'(x) = \lim_{h \to 0} \dfrac{f(x+h) - f(x)}{h}$	$\checkmark f'(x) = \lim_{h \to 0} \dfrac{f(x+h) - f(x)}{h}$
	$\qquad = \lim_{h \to 0} \dfrac{-4xh - 2h^2}{h}$	
	$\qquad = \lim_{h \to 0} \dfrac{h(-4x - 2h)}{h}$	$\checkmark \lim_{h \to 0}(-4x - 2h)$
	$\qquad = \lim_{h \to 0}(-4x - 2h)$	$\checkmark -4x \qquad\qquad (5)$
	$\qquad = -4x$	
	OR/*OF*	$\checkmark f'(x) = \lim_{h \to 0} \dfrac{f(x+h) - f(x)}{h}$
	$f'(x) = \lim_{h \to 0} \dfrac{f(x+h) - f(x)}{h}$	
	$\qquad = \lim_{h \to 0} \dfrac{3 - 2(x+h)^2 - (3 - 2x^2)}{h}$	$\checkmark 3 - 2x^2 - 4xh - 2h^2$
	$\qquad = \lim_{h \to 0} \dfrac{3 - 2x^2 - 4xh - 2h^2 - 3 + 2x^2}{h}$	$\checkmark -4xh - 2h^2$
	$\qquad = \lim_{h \to 0} \dfrac{-4xh - 2h^2}{h}$	
	$\qquad = \lim_{h \to 0} \dfrac{h(-4x - 2h)}{h}$	$\checkmark \lim_{h \to 0}(-4x - 2h)$
	$\qquad = \lim_{h \to 0}(-4x - 2h)$	$\checkmark -4x \qquad\qquad (5)$
	$\qquad = -4x$	
8.2	$y = \dfrac{12x^2 + 2x + 1}{6x}$	
	$\quad = 2x + \dfrac{1}{3} + \dfrac{1}{6x}$	$\checkmark \dfrac{12x^2}{6x} + \dfrac{2x}{6x} + \dfrac{1}{6x}$
	$\quad = 2x + \dfrac{1}{3} + \dfrac{1}{6}x^{-1}$	$\checkmark \dfrac{1}{6}x^{-1}$
	$\dfrac{dy}{dx} = 2 - \dfrac{1}{6}x^{-2}$	$\checkmark 2$
	$\qquad = 2 - \dfrac{1}{6x^2}$	$\checkmark -\dfrac{1}{6}x^{-2}$
		(4)

8.3	$y = x^3 + bx^2 + cx - 4$	
	$y' = 3x^2 + 2bx + c$	✓ $y' = 3x^2 + 2bx + c$
	$y'' = 6x + 2b$	✓ $y'' = 6x + 2b$
	At point of inflection:	
	$y'' = 6x + 2b = 0$	
	Substitute $x = 2$:	✓ $y'' = 0$
	$6(2) + 2b = 0$	✓ sub $x = 2$ into $y'' = 0$
	$\quad 2b = -12$	
	$\quad\; b = -6$	✓ value of b
	$\quad\quad y = x^3 - 6x^2 + cx - 4$	
	Substitute $(2; 4)$:	
	$4 = 2^3 - 6(2)^2 + c(2) - 4$	✓ substitute $(2; 4)$
	$2c = 24$	
	$\;c = 12$	✓ value of c
	$y = x^3 - 6x^2 + 12x - 4$	(7)
		[16]

QUESTION/*VRAAG* 9
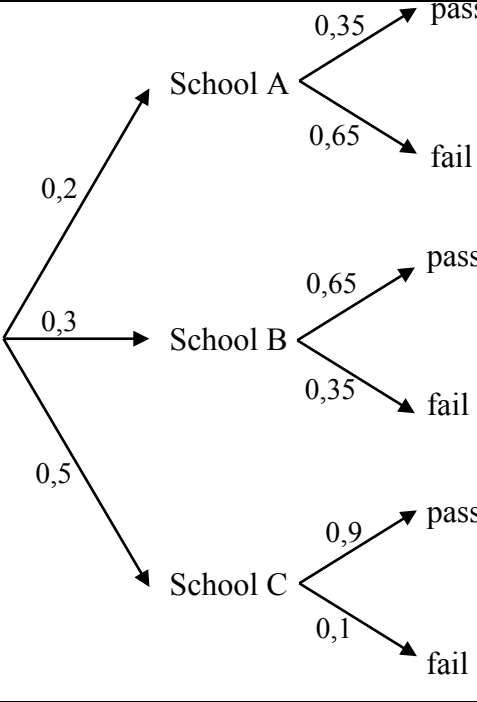
9.1	$(0 ; 1)$	✓ answer
		(1)
9.2	$f(x) = x^3 - x^2 - x + 1$	
	$f(x) = x^2(x-1) - (x-1)$	✓ $(x-1)$
	$f(x) = (x-1)(x^2-1)$	✓ (x^2-1)
	$f(x) = (x-1)(x-1)(x+1)$	✓ $(x-1)(x-1)(x+1)$
	$f(x) = 0$	
	$(x-1)(x-1)(x+1) = 0$	✓ $(-1; 0)$
	x-intercepts: $(-1; 0); (1; 0)$	✓ $(1; 0)$
		(5)
	OR	
	$f(x) = x^3 - x^2 - x + 1$	
	$f(x) = (x-1)(x^2-1)$	✓ $(x-1)$
	$f(x) = (x-1)(x-1)(x+1)$	✓ (x^2-1)
	$f(x) = 0$	✓ $(x-1)(x-1)(x+1)$
	$(x-1)(x-1)(x+1) = 0$	
	x-intercepts: $(-1; 0); (1; 0)$	✓ $(-1; 0)$
		✓ $(1; 0)$
	OR	(5)

	$f(x) = x^3 - x^2 - x + 1$ $f(x) = (x+1)(x^2 - 2x + 1)$ $f(x) = (x+1)(x-1)(x-1)$ $f(x) = 0$ $(x-1)(x-1)(x+1) = 0$ x-intercepts: $(-1; 0); (1; 0)$	✓ $(x+1)$ ✓ $(x^2 - 2x + 1)$ ✓ $(x-1)(x-1)(x+1)$ ✓$(-1; 0)$ ✓$(1; 0)$ (5)
9.3	$f(x) = x^3 - x^2 - x + 1$ $f'(x) = 3x^2 - 2x - 1$ $f'(x) = 0$ $(3x+1)(x-1) = 0$ $x = -\dfrac{1}{3}$ or $x = 1$ $y = \dfrac{32}{27}$ $y = 0$ $\left(-\dfrac{1}{3}; \dfrac{32}{27}\right)$ $(1; 0)$	✓ $f'(x) = 3x^2 - 2x - 1$ ✓ $f'(x) = 0$ ✓factorisation ✓x value ✓x value ✓$y = \dfrac{32}{27}$ (6)
9.4		✓y– and x–intercepts ✓shape ✓turning points (3)
9.5	$f'(x) < 0$ $-\dfrac{1}{3} < x < 1$ **OR/*OF*** $\left(-\dfrac{1}{3} ; 1\right)$	✓ $x > -\dfrac{1}{3}$ ✓ $x < 1$ (2) ✓ $(-\dfrac{1}{3}$ ✓ $1)$ (2) **[17]**

QUESTION/*VRAAG* 10

10.1	$60 = 2b + 2r + \frac{1}{2}(2\pi r)$	$\checkmark\ 60 = 2b + 2r + \frac{1}{2}(2\pi r)$
	$2b = 60 - 2r - \pi r$	
	$b = 30 - r - \frac{1}{2}\pi r$	$\checkmark\ b = 30 - r - \frac{1}{2}\pi r$
		(2)
10.2	Area = area of rectangle + area of semicircle	
	$\quad A(r) = \text{length} \times \text{breadth} + \frac{1}{2}(\text{area of circle})$	
	$\quad = (2r)\left(30 - r - \frac{1}{2}\pi r\right) + \frac{1}{2}(\pi r^2)$	$\checkmark\ (2r)\left(30 - r - \frac{1}{2}\pi r\right)$
		$\checkmark\ \frac{1}{2}(\pi r^2)$
	$\quad = 60r - 2r^2 - \pi r^2 + \frac{1}{2}\pi r^2$	
	$\quad = 60r - 2r^2 - \frac{1}{2}\pi r^2$	$\checkmark\ 60r - 2r^2 - \frac{1}{2}\pi r^2$
	$\quad = 60r - \left(2 + \frac{1}{2}\pi\right)r^2$	
	For a maximum,	
	$\quad\quad A'(r) = 0$	$\checkmark\ A'(r) = 0$
	$60 - 2\left(2 + \frac{1}{2}\pi\right)r = 0$	
	$\quad 60 - (4 + \pi)r = 0$	$\checkmark\ 60 - 2\left(2 + \frac{1}{2}\pi\right)r$
	$\quad\quad\quad r = \dfrac{60}{4 + \pi}$	
	$\quad\quad\quad\quad = 8{,}40 \text{ m}$	$\checkmark$ answer
		(6)
		[8]

QUESTION/*VRAAG* 11

11.1	$8 \times 7 \times 6 \times 5 \times 4 \quad$ or $\quad \dfrac{8!}{3!}$ $= 6720$	✓ $8 \times 7 \times 6 \times 5 \times 4 \, / \, \dfrac{8!}{3!}$ ✓ 6720 (2)
11.2	$P(A \text{ and } B) = P(A) \times P(B)$ $\qquad\qquad\quad = 0,4 \times 0,35$ $\qquad\qquad\quad = 0,14$ $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ $\qquad\qquad\quad = 0,4 + 0,35 - 0,14$ $\qquad\qquad\quad = 0,61$	✓ $0,4 \times 0,35$ ✓ $0,14$ ✓ substitution ✓ answer (4)
11.3.1	$\begin{array}{cc} 100\% - 20\% & 1 - 0,2 \\ \quad\quad\quad \text{or/of} & \\ = 80\% & = 0,8 \end{array}$ **OR/*OF*** $30\% + 50\% = 80\%$ or/of $0,3 + 0,5 = 0,8$	✓ $100\% - 20\%$ or $1 - 0,2$ ✓ 80% or $0,8$ ✓ $30\% + 50\%$ or $0,3 + 0,5$ ✓ 80% or $0,8$ (2)
11.3.2	$0,3 \times 0,35 = 0,105$ $\qquad\qquad\quad = 10,5\%$	✓ $0,3$ ✓ $0,35$ ✓ $0,105 = 10,5\%$ (3)
11.3.3	$(0,2 \times 0,35) + (0,3 \times 0,65) + (0,5 \times 0,9)$ $= 0,715$ $= 71,5\%$	✓ $0,2 \times 0,35$ ✓ $0,3 \times 0,65$ ✓ $0,5 \times 0,9$ ✓ answer (4) **[15]**

TOTAL/*TOTAAL*: 150

basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/ *SENIORSERTIFIKAAT-EKSAMEN*

MATHEMATICS P1/*WISKUNDE V1*

2016

MARKING GUIDELINE (ADDENDUM)

MARKS/*PUNTE*: 150

NOTE:
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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	- incorrect rounding 2/3 – only rounding penalization - use of calculator 2/3 – this is where use of calculator for factors get used - answer in surd form 2/3 (at least simplified under square root)
1.1.2	- CA mark only if quadratic equation - check answers - if $6x^2 - 15 = x + 1$ breakdown 0/3 - both answer must be seen before selection if no factors are shown - if in the context of their incorrect sum, both of the answers are NA, both need to be shown as NA
1.1.3	$(x + 6)(x - 4) \geq 0$ $x \geq 4$ or / and $x \geq -6$, award 1/3 marks (factors) $x \leq 4$ or / and $x \leq -6$, award 1/3 marks (factors) $-6 \leq x \leq 4$, award 1/3 marks (factors) $x \leq -6$ and $x \geq 4$, award 2/3 marks - equal is left out: -1 Answer only 3/3
1.2	**NB**: At the second error related to a mark (two skills) – no further marking. If incorrect algebra leads to the equation being linear: max 2/6 These marks will be the changing of the formula and the substitution mark.
1.3.2	CA from 1.3.1 - If $7^x = p$ can award 1 mark for the concept - If answer $x = 2$ only 2/3

QUESTION/*VRAAG 2*

2.1.2	CA from 2.1.1 Answer only 2/2
2.1.3	Answer only 1/4 - If $n = 7$ 2/4 - Incorrect working that leads to use of logs and an not a natural number max 2/4
2.2.1	Answer only 2/2
2.2.2	Answer only 1/6

	• S_n has to equal 30 500 otherwise a BD

QUESTION/*VRAAG 3*

3.2	$n = 5$ only 1/3
3.3	Answer only 1/4

QUESTION/*VRAAG 4*

4.1	$x = 4$; $y = 3$ 1/1
4.3	$y = 0$ can be implied
4.4	CA from 4.2 and 4.3

QUESTION/*VRAAG 5*

5.1	Only working out, but no sketch max 4/6 – loose shape mark per graph not sketched
5.2	CA from turning point in 5.1
5.3	CA from sketch (TP to *y*-intercept)
5.4	Answer only 2/2

QUESTION/*VRAAG 6*

6.1	Answer only 2/2 If answer not in terms of *b* max 1/2
6.3	Coordinate from not needed

QUESTION/*VRAAG 7*
Penalise candidates a maximum of one mark (overall) for notation error in 7.1 and 7.2

7.1	• Interchange A and P – breakdown 0/3 • Wrong formula 0/3 • Early rounding: answer is 12,93% – 2/3
7.3	• *i* and *n* incorrect – learner can still get the substitution mark 1/6 • If quarterly is taken as monthly consistently in both parts 5/6 $$A = P(1 + i)^n$$ • If 10 years is used: $= 115\ 902{,}69\left(1 + \dfrac{0{,}075}{4}\right)^{4 \times 10}$ 5/6 $\qquad\qquad\qquad\qquad = R\ 243\ 667{,}94$

QUESTION/*VRAAG 8*
Penalise candidates a maximum of one mark (overall) for notation error in 8.1 and 8.2

8.1	$f'(x) = \lim_{h \to 0} \dfrac{f(x+h) - f(x)}{h}$ ⌣Notation ⌣formula Formula can be implied
8.2	• If function and derivative is mixed but splitting of fractions is evident max ¾ • If they start with differentiation – breakdown 0/4
8.3	$y'' = 0$ can be implied

QUESTION/*VRAAG 9*

9.2	No working is shown(calculator used) • If the cubic becomes a quadratic 2/5 • If three brackets 5/5
9.3	$f'(x) = 0$ cannot be implied $f'(x) = 3x^2 - 2x - 1$ $x = -\left(\dfrac{-2}{2(3)}\right)$ **BE CAREFUL** 1/6 for derivative $= \dfrac{1}{3}$
9.4	If dots only indicated on the graph 1/3 – x and y-intercepts
9.5	Only CA from a cubic graph Each answer gets evaluated independently

QUESTION/*VRAAG 10*

10.2	Derivative equal to zero is an independent mark $A'(r) = 0$ can be implied if working is correct

QUESTION/*VRAAG 11*

If percentages are used – penalize once per question

11.1	Answer only 2/2 2 or 0 marks
11.3.2	Do not penalize rounding
11.3.3	Do not penalize rounding