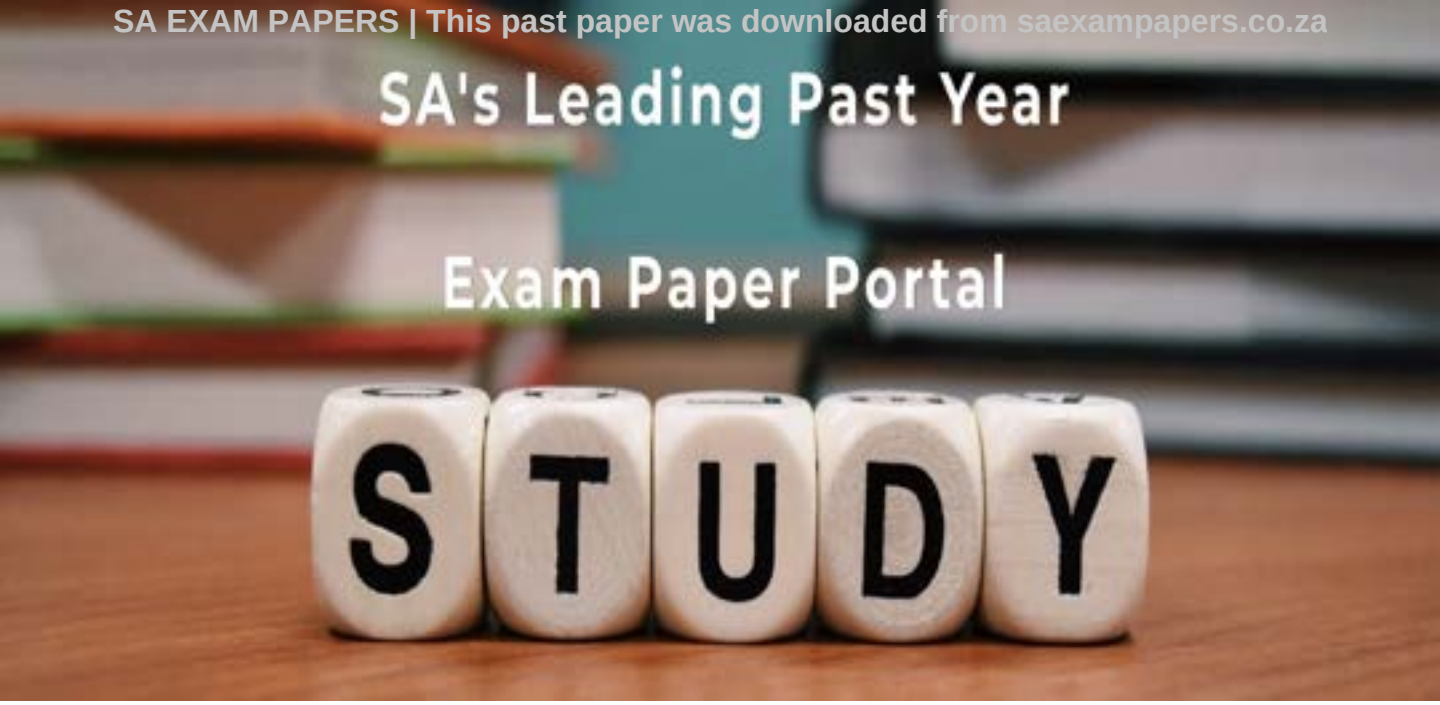

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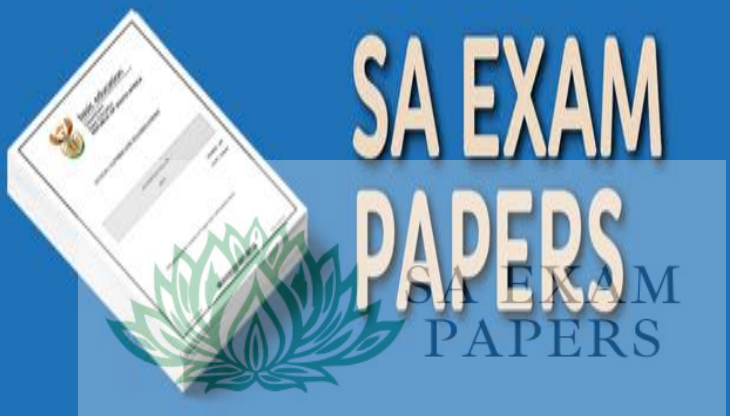


education
MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA

FURTHER EDUCATION AND TRAINING

GRADE 12

MATHEMATICS P1

PRE TRIAL

MARKING GUIDELINES

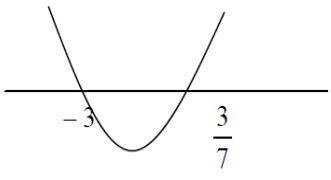
AUGUST 2024

MARKS: 150

This marking guidelines consists of twelve pages.

NOTE:

- If a learner answers a question TWICE, only mark the FIRST attempt.
- If a learner has crossed out (cancelled) an attempt to a question and NOT redone the solution, mark the crossed out (cancelled) version.
- Consistent accuracy (CA) applies in ALL aspects of the marking guidelines; however, it stops at the second calculation error.
- Rounding is an independent mark.
- General principle of making, if the candidate makes one mistake one mark shall be deducted.
- A conclusion mark can only be given if relevant calculations precede it.

	Question 1	
1.1.1	$x = 3$ ✓or $x = 2$✓	$x = 3$ ✓ $x = 2$✓ (2)
1.1.2	$x = \frac{-3 \pm \sqrt{(3)^2 - 4(2)(-7)}}{2(2)}$✓ $x = \frac{-3 \pm \sqrt{65}}{4}$✓ $x = 1.27$ ✓or $x = -2.77$✓	Correct substitution✓ Simplification✓ $x = 1.27$ ✓ $x = -2.77$✓ (4)
1.1.3	$2^x - 2^{\frac{2}{x}} - 6 = 0$✓ $\left(2^{\frac{x}{2}} - 4\right)(2^{\frac{x}{2}} + 2) = 0$✓ $2^{\frac{x}{2}} = 2^2$ or $2^{\frac{x}{2}} = -2$ (N/A)✓ $\frac{x}{2} = 2$ $x = 4$✓	Standard form ✓ factors✓ $2^{\frac{x}{2}} = -2$ (N/A)✓ $x = 4$✓ (4)
1.1.4	$(3x - 7)(x + 3) > 0$✓ Critical values: $x = \frac{7}{3}$ or $x = -3$ + 0 − 0 + −3 $\frac{3}{7}$  ✓ $x < -3$ ✓or $x > \frac{3}{7}$✓	CVs✓ Method✓ $x < -3$ ✓ $x > \frac{3}{7}$✓ (4)
1.2.1	$x = 4y - 4$✓ $y(4y - 4) = 8$✓ $4y^2 - 4y - 8 = 0$	Equa…(3)✓ Sub…✓ Sta Form✓

	$y^2 - y - 2 = 0$✓ $(y-2)(y+1) =$✓ $y = 2\ or\ y = -1$✓ $x = 4\ or\ x = -8$✓	Factors ✓ y-values✓ x-values ✓ (6)
1.2.2	$y = x$✓$or\ y = -x$✓	$y = x$✓ $y = -x$✓ (2)
1.3.1	$36 - 4k < 0$✓ $-4k < -36$ $k > 9$ ✓	$36 - 4k < 0$✓ $k > 9$ ✓ (2)
1.3.1	$2k = 0$ $k = 0$✓	$k = 0$✓ (1)
		[25]

Question 2

2.1.1	$3(1) + a = 11$ $a = 8$✓ 1+8+$b = 9$ $b = 0$✓ $Tn = n^2 + 8n$✓	$a = 8$✓ $b = 0$✓ $Tn = n^2 + 8n$✓ (3)
2.1.2	$n^2 + 8n = 240$ $n^2 + 8n - 240 = 0$✓ $(n-12)(n+20) = 0$✓ $n = 12$ ✓$or\ n = -20$ (N/A) ✓	Sta Form✓ Factors ✓ $n = 12$ ✓ $n = -20$ (N/A) ✓ (4)
2.2.1	$3 + (n-1)(-4)$=-89✓	$T_n = -89$✓

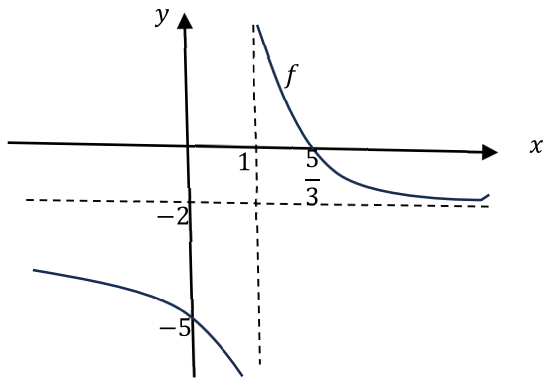
	$n-1=23$✓ $n=24$ ✓ 24 terms.	Simplification ✓ $n=24$ ✓ (3)
2.2.2	Negative sequence -1; -5; -9…;-89✓ $n=24-1=23$ $s_n=\frac{23}{2}[2(-1)+(23-1)(6)]$✓ $s_n=1495$✓	-1; -5; -9…;-89✓ Sub… ✓ $s_n=1495$✓ (3)
2.2.3	Sequence of terms divisible by 3 3;-9;-21;…;-81✓ $-81=3-12$✓$(n-1)$✓ $n=6$ ✓	3;-9;-21;…;-81✓ $d=-12$ ✓ $T_n=-81$ ✓ $n=6$ ✓ (4)
		[17]

Question 3

3.1	$r=\frac{2}{3}$ $-1<\frac{2}{3}<1$✓	$-1<\frac{2}{3}<1$✓ (1)
3.2	$s_\infty=\frac{3}{1-\frac{2}{3}}$✓ $=9$✓	Sub.. ✓ $S_\infty=9$ ✓ (2)
3.3	$S_\infty-S_n=\frac{3}{1-\frac{2}{3}}-\frac{3(1-\left(\frac{2}{3}\right)^n}{1-\frac{2}{3}}$✓ $=9$✓$-9(1-\left(\frac{2}{3}\right)^n$✓ $=9(1-1+\left(\frac{2}{3}\right)^n$✓	Sub S_n…✓ Sub S_∞✓ Simp ✓ Common factor✓

	$= 9\left(\frac{2}{3}\right)^n$ ✓	$9\left(\frac{2}{3}\right)^n$ ✓ (5)
		[8]

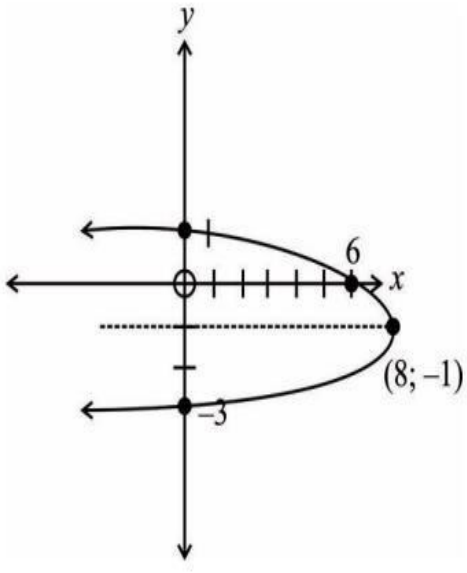
Question 4

4.1	$= \frac{-2x+2+3}{x-1}$ ✓ $= \frac{-2x+2}{x-1}$ ✓ $+ \frac{3}{x-1}$ ✓ $= \frac{-2(x-1)}{x-1}$ ✓ $+ \frac{3}{x-1}$ $= \frac{3}{x-1} - 2$	$5 = 2 + 3$ ✓ Common denominator ✓ Splitting ✓ Factorization ✓ (4)
4.2	$x = 1$ ✓ $y = -2$ ✓	$x = 1$ ✓ $y = -2$ ✓ (2)
4.3	0 ✓ $= \frac{3}{x-1} - 2$ $2 = \frac{3}{x-1}$ $x = \frac{5}{3}$ ✓ $y = -5$ ✓	$f(x) = 0$ ✓ $x = \frac{5}{3}$ ✓ $y = -5$ ✓ (3)
4.4		Shape ✓ Intercepts ✓ Asymptotes ✓ (3)

		3
4.5	$y \in \mathbb{R}$✓; $y \neq 2$ ✓	$y \in \mathbb{R}$✓ $y \neq 2$ ✓ (2)
		[15]

Question 5

5.1	Axis of symmetry: $\frac{-3+1}{2}$ ✓$= -1$✓ $x < -1$ ✓$or\ x > 0$ ✓	$\frac{-3+1}{2}$ ✓ $= -1$✓ $x < -1$ ✓ $x > 0$ ✓ (4)
5.2	$q = -1$✓ Sub (1:2) $2=d^1 - 1$✓ $d = 3$✓ $\therefore g(x) = 3^x - 1$✓	$q = -1$✓ Sub (1:2)✓ $d = 3$✓ $g(x) = 3^x - 1$✓ (4)
5.3	$x = 3^y - 1$✓ $3^y = x + 1$ $y = \log_3(x + 1)$✓	Swoping ✓ $y = g^{-1}(x) =$ $\log_3(x + 1)$✓ (2)
5.4	$x > -1$✓✓	$x > -1$✓ ✓(2)
5.5	$f(x) = a(x + 3)(x - 1)$✓ $6 = a(3)(-1)$✓ $a = -2$✓ $\therefore f(x) = -2(x + 3)(x - 1)$ $= -2x^2 - 4x + 6$✓ $a = -2, b = -4, c = 6$	Sub x-intercepts✓ Sub C(0;6)✓ $a = -2$✓ $-2x^2 - 4x + 6$✓ (4)

5.6		Shape ✓ x-intercept ✓ TP: (8;-1)✓ y-intercepts ✓ (4)
5.7	$k > -6$✓✓	$k > -6$✓✓ (2)
		[23]

Question 6

6.1.1	$i = \frac{0.1}{4} = 0.025$✓	0.025✓ (1)
6.1.2	$A = 5000\left(1 + \frac{0.1}{4}\checkmark\right)^{2\times4\checkmark}$ $A = R6092,01$✓	$n = 8$ ✓ $i = \frac{0.1}{4}$ ✓ $A = R6092,01$✓ (3)
6.2.1	Amount paid for 110 laptops: $6000 \times 110 = A = R660\ 000$✓ Depreciation over 5 years: $A = 660\ 000(\left(1 - \frac{15}{100}\right)^5$ ✓ $= 292\ 845,51$✓ Inflation : $= 660\ 000\left(1 + \frac{6}{100}\right)^5$ ✓ A= 883 228,881✓	Total paid: $= R660\ 000$✓ Sub correct F✓ 292 845,51✓ Sub correct F✓ 883 228,881✓ Difference:

	$= 883\,228{,}88 - 292\,845{,}51$ $= R590\,383{,}37$✓	$R590\,383{,}37$ ✓ (5)
6.2.2	Sinking fund: $590\,383{,}37 = x\left[\frac{\left(1+\frac{0{,}12}{12}\right)^{5\times 12}\checkmark - 1}{\frac{0{,}12}{12}\checkmark}\right]\checkmark$ $x = 7\,228{,}92$✓	Sub… ✓ $n = 60$ ✓ $i = \frac{0.12}{12}$ ✓ $x = 7\,228{,}92$✓ (4)
		[13]

Question 7

7.1	$f(x+h) = 3 - 2(x+h)^2$ $= 3 - 2(x^2 + 2hx + h^2)$ $= 3 - 2x^2 - 4xh - 2h^2$ $= \lim_{h\to 0} \frac{3-2x^2-4hx-2h^2-(3-2x^2)}{h}\checkmark$ $= \lim_{h\to 0} \frac{3-2x^2-4hx-2h^2-3+2x^2}{h}\checkmark$ $= \lim_{h\to 0} \frac{-4hx-2h^2}{h}\checkmark$ $= -4x\checkmark$	Sub… ✓ Simplification ✓ Common factor ✓ Sub… $h = 0$ ✓ $-4x$✓ (5)
7.2.1	$y = -x^{-1} + x^{\frac{1}{2}}\checkmark$ $y = x^{-2}\checkmark + \frac{1}{2}x^{-\frac{1}{2}}\checkmark$	$y = -x^{-1} + x^{\frac{1}{2}}\checkmark$ x^{-2} ✓ $\frac{1}{2}x^{-\frac{1}{2}}$ ✓ (3)
7.2.2	$= D_x\left[\frac{8}{8x^5} - \frac{3x^6}{8x^5}\right]$ $= D_x\left[x^{-5} - \frac{3}{8}x\right]\checkmark$ $= -5x^{-6}\checkmark - \frac{3}{8}\checkmark$	$D_x\left[x^{-5} - \frac{3}{8}x\right]\checkmark$ $-5x^{-6}$ ✓ $-\frac{3}{8}\checkmark$ (3)

		[11]

Question 8

8.1	$f(x) = a(x+6)(x+1)(x-2)$✓ $24 = a(6)(1)(-2)$✓ $a = -2$✓ $f(x) = -2(x+6)(x+1)(x-2)$✓ $= -2(x+6)(x^2 - x - 2)$ $= -2(x^3 - x^2 - 2x - 8x - 12)$ $= -2x^3 - 10x^2 + 16x + 24$✓ $\therefore a = -2, b = -10, c = 16, d = 24$	Sub x-intercepts ✓ Sub(0:24)✓ $a = -2$✓ Simplification ✓ $-2x^3 - 10x^2 + 16x + 24$✓ (5)
8.2	At D and E, $f'(x) = 0$ $-6x^2 - 20x + 16 = 0$✓ $3x^2 + 10x - 8 = 0$ $(3x-2)(x+4) = 0$✓ $x = \frac{2}{3}$ or $x = -4$✓ $f(-4) = -2(-4)^3 - 10(-4)^2 + 16(-4) + 24 = -72$ D(-4; -72)✓	$-6x^2 - 20x + 16 = 0$✓ factors✓ $x = \frac{2}{3}$ or $x = -4$✓ D(-4; -72)✓ (4)
8.3	$-4 + p = 0, -72 + q = 0$ $\therefore p = 4$ ✓and $q = 72$✓	$p = 4$ ✓ $q = 72$✓ (2)
8.4	$x < -6$✓or $\frac{-5}{3} < x < 0$ ✓or $x > 2$✓	$x < -6$✓ $\frac{-5}{3} < x < 0$ ✓ $x > 2$✓ (3)
8.5	0✓$< k < 72$✓✓	0✓$< k < 72$✓✓ (3)

`Question 9

9.1	B$\left(x; 4-\frac{x^2}{4}\right)$✓✓	x-value ✓ y-value ✓ (2)
9.2	Area ΔOBD=$\frac{1}{2}$(OD)(DB) $=\frac{1}{2}x\left(4-\frac{x^2}{4}\right)$✓ $=2x-\frac{x^3}{8}$ ✓$x\in[0;4]$✓	Sub correct F ✓ $2x-\frac{x^3}{8}$ ✓ $x\in[0;4]$✓ (3)
9.3	Max Area when $\frac{dArea}{dx}$ =0✓ $2-\frac{3x^2}{8}=0$ $\frac{3x^2}{8}=2$✓ $x^2=\frac{16}{3}$✓ $x=\frac{4\sqrt{3}}{3}$= 2,3 units✓	$\frac{dArea}{dx}$ =0✓ $\frac{3x^2}{8}=2$✓ $x^2=\frac{16}{3}$✓ $x=\frac{4\sqrt{3}}{3}$ = 2,3 units✓ (4)
		[9]

Question 10

10.1.1	$a = 450$ ✓, $b = 319$ ✓, $c = 298$ ✓, $d = 748$ ✓	$a = 450$ ✓ $b = 319$ ✓ $c = 298$ ✓ $d = 748$ ✓ (4)
10.1.2	$P(Female\ who\ has\ not\ broken\ a\ limb)$ $= \frac{298}{1530}$ ✓ $= \frac{149}{765}$ ✓	298 ✓ $\frac{149}{765}$ ✓ (2)
10.1.3	$P(Female\ \&\ broken)$ $= \frac{450}{1530}$ $= \frac{5}{17}$ $= 0{,}29$ ✓ $P(Female) \times P(Broken\ a\ limb)$ $= \frac{748}{1530} \times \frac{913}{1530}$ ✓ $= 0{,}29$ The events of being female and having broken a limb are independent. ✓	0,29 ✓ $\frac{748}{1530} \times \frac{913}{1530}$ ✓ Conclusion ✓ (3)
10.2.1	$\frac{10!}{2!\,2!\,2!\,2!} = 226\,800$ ✓ ✓ ✓	$10!$ ✓ $2!\,2!\,2!\,2!$ ✓ $226\,800$ ✓ (3)
10.2.2	$\frac{9!2!}{\frac{2!2!2!2!}{226800}} = \frac{1}{5}$ ✓ ✓ ✓	$9!\,2!$ ✓ $\frac{2!2!2!2!}{226800}$ ✓ $\frac{1}{5}$ ✓

		(3)
		[15]
	TOTAL:	**150**