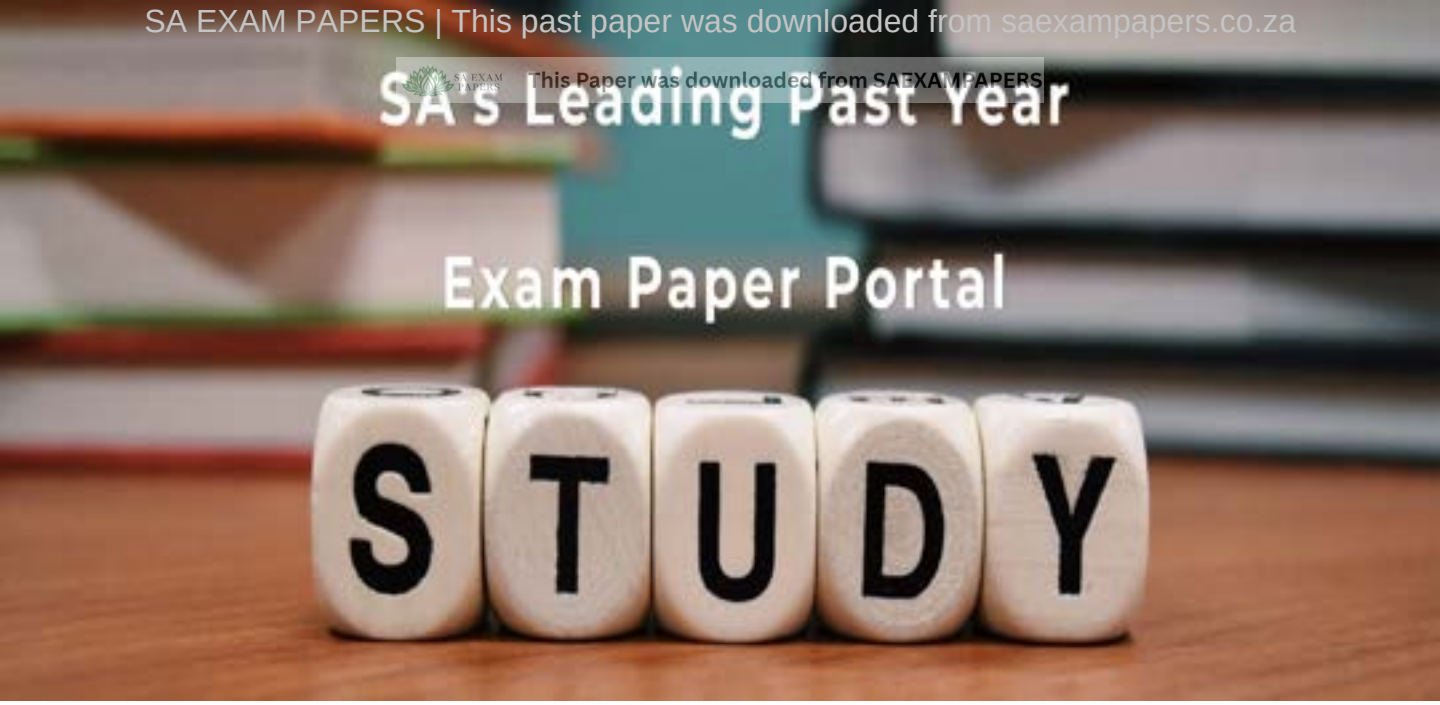


Province of the
EASTERN CAPE
EDUCATION

OR TAMBO COASTAL DISTRICT

NATIONAL SENIOR CERTIFICATE

GRADE 12

TERM 1 CONTROLLED TEST 2026

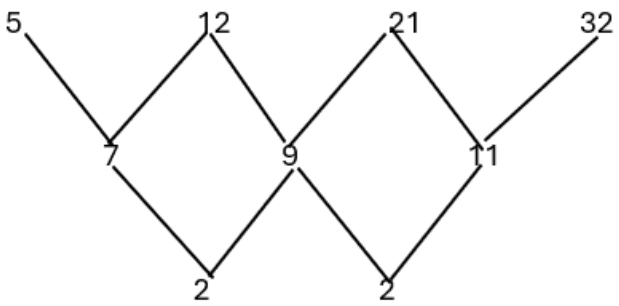
MATHEMATICS

MARKING GUIDELINES

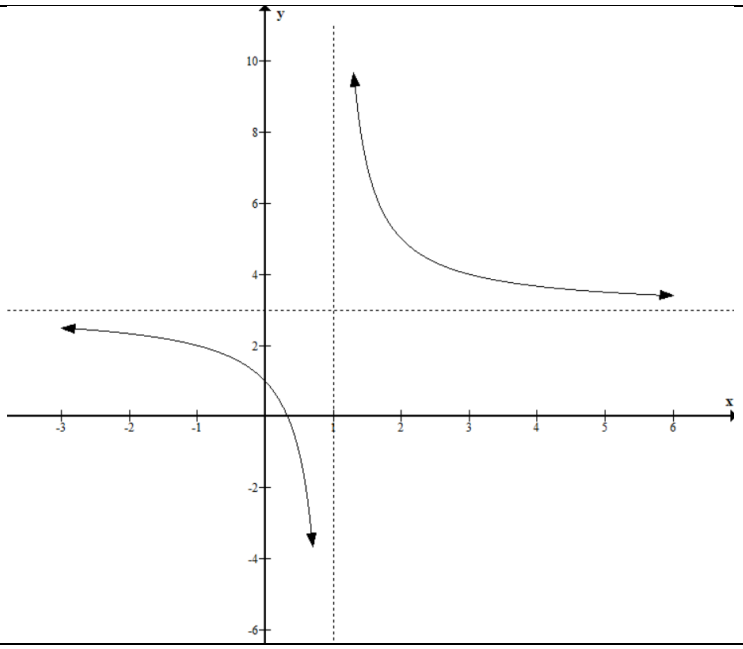
This marking guidelines consist of 8 pages.

NOTE

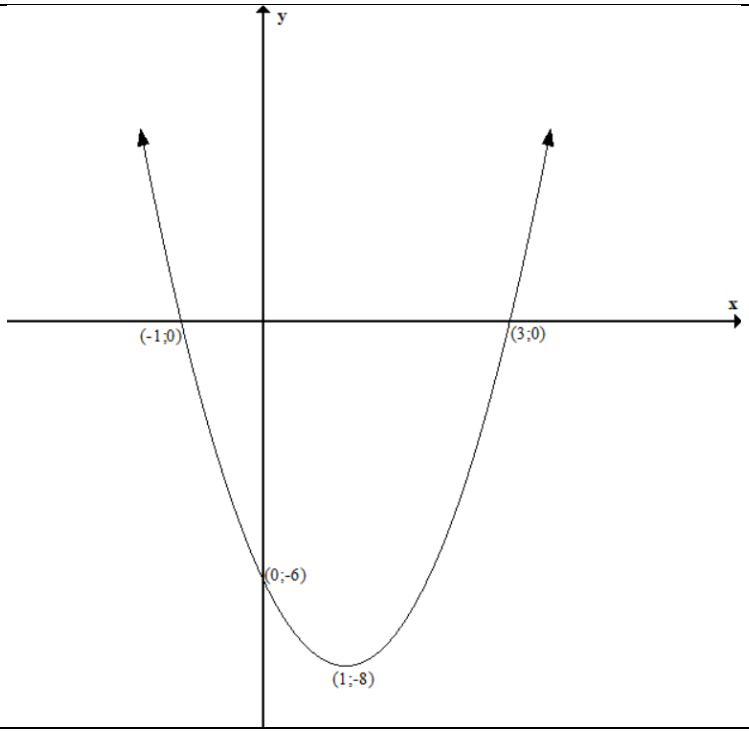
- If a candidate answers a question TWICE, only mark the FIRST attempt.
- If a candidate has crossed out an attempt of a question and not redone the question, mark the crossed out version.
- Consistent accuracy applies in ALL aspects of the Marking Guidelines. Stop marking at the calculation error.
- Assuming answers/values in order to solve a problem is NOT acceptable.

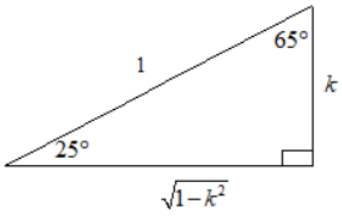
QUESTION 1			
1.1	 $2a=2 \quad 3a+b=7 \quad a+b+c=5$ $a=1 \quad 3(1)+b=7 \quad 1+4+c=5$ $b=4 \quad c=0$ $T_n=1.n^2+4.n+0$ $T_n=n^2+4n$	✓value of a ✓value of b ✓value of c ✓ equation	(4)
1.2	$T_{25}=(25)^2+4(25)$ $T_{25}=725$	✓substitution ✓answer	(2)
1.3	$T_n=n^2+4n=1152$ $n^2+4n-1152=0$ $(n-32)(n+36)=0$ $n\neq -36$ $n=32$ $T_{32}=1152$	✓substitution ✓factosattion ✓ $n\neq -36$ ✓answer	(4)
1.4	$T_{n+1}-T_n=(n+1)^2+4(n+1)-(n^2+4n)$ $T_{n+1}-T_n=n^2+2n+1+4n+4-n^2-4n$ $T_{n+1}-T_n=2n+5$ $2n$ is always an even number adding 5 to any even number gives odd number $T_{n+1}-T_n=2n+5$ is always an odd number	✓substitution ✓simplification ✓answer	(3)
			[13]

QUESTION 2			
2.1.1	$T_1 = S_1 = \frac{3(1)^2 - 5(1)}{2} = -1$ $T_2 = S_2 - S_1 = \frac{3(2)^2 - 5(2)}{2} - \frac{3(1)^2 - 5(1)}{2} = 2$ $T_3 = S_3 - S_2 = \frac{3(3)^2 - 5(3)}{2} - \frac{3(2)^2 - 5(2)}{2} = 5$ $-1; 2; 5; \ldots$	✓ first term ✓second term ✓third term	(3)
2.1.2	$T_{20} = S_{20} - S_{19} = \frac{3(20)^2 - 5(20)}{2} - \frac{3(19)^2 - 5(19)}{2} = 56$	✓ S_{20} ✓ S_{19} ✓answer	(3)
2.2	$-1 < k - 1 < 1$ $-1 + 1 < k < 1 + 1$ $-1 < k < 2$	✓ $-1 < k - 1 < 1$ ✓ $-1 + 1 < k < 1 + 1$ ✓ $-1 < k < 2$	(3)
2.3	$S_n = \frac{a(r^n - 1)}{r - 1};\ S_{2n} = \frac{a(r^{2n} - 1)}{r - 1}$ $\sum_{T_{n+1}}^{T_{2n}} = S_{2n} - S_n = \frac{a(r^{2n} - 1)}{r - 1} - \frac{a(r^n - 1)}{r - 1}$ $= \frac{a}{r - 1}\left[(r^{2n} - 1) - (r^n - 1)\right]$ $= \frac{a}{r - 1}(r^{2n} - 1 - r^n + 1) = \frac{a}{r - 1}(r^{2n} - r^n)$ $= \frac{a}{r - 1} r^n (r^n - 1) = r^n . \frac{a(r^n - 1)}{r - 1}$ $= S_n . r^n$	✓ S_{2n} ✓ $S_{2n} - S_n$ ✓factor $\frac{a}{r-1}$ ✓ factor r^n ✓simplification	(5)
			[14]

QUESTION 3			
3.1.1	$x=1$	✓ $x=1$	(1)
3.1.2	$y=3$	✓ $y=3$	(1)
3.2	$f(x)=\frac{2}{x-1}+3$ for $x-$int let $y=o$ $0=\frac{2}{x-1}+3$ $-3(x-1)=2$ $x=\frac{1}{3}$ $\left(\frac{1}{3};0\right)$	✓substitution for *x*-intercepts ✓simplify ✓answer	(3)
3.3		✓asymptotes ✓y-intercepts ✓point fixing graph ✓shape	(4)
3.4	$0 \le x < 1$	✓✓answer	(2)
			[11]

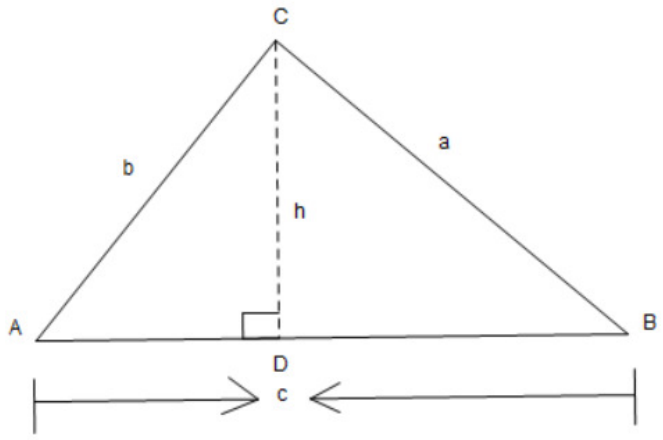
QUESTION 4			
4.1	$g(x)=ax^2$ $8=a(2)^2=4a$ $a=2$ $g(x)=2x^2$	✓substitution ✓answer	(2)
4.2	$h(x)=\log_b x$ $3=\log_b 8$ $b^3=8=2^3$ $b=3$ $h(x)=\log_3 x$	✓substitution ✓answer	(2)
4.3	$y=\log_b x$ $x=\log_b y$ $y=b^x$ $y=3^x$	✓interchange variable. ✓answer	(2)
4.4	Domain $=x/x>0$	✓✓answer	(2)
4.5.1	$0<x<1$	✓✓answer	(2)
4.5.2	$x\geq 1$	✓✓answer	(2)
			[12]
QUESTION 5			
5.1	$f(x)=2(x^2-2x-3)$ $f(x)=2[(x-1)^2-4]$ $f(x)=2(x-1)^2-8$	✓factor 2 ✓complete square ✓answer	(3)
5.2.1	TP(1;8)	✓x-value ✓y-value	(2)
5.2.2	$f(x)=2x^2-4x-6$ $x-\text{int}$ let $y=0$ $2x^2-4x-6$ $x^2-2x-3=0$ $(x-3)(x+1)=0$ $x=3$ or $x=-1$ $(3;0),\ (-1;0)$	✓y=0 ✓factorisation ✓Values of x	(3)

5.3		✓intercepts with axis ✓indication of y-intercepts ✓shape	(3)
5.4	$y-\text{int}$ $(0;3),\ (0;-1)$	✓ (0;3) ✓ (0;-1)	(2)
4.5	Domain=x / $x \geq -8$	✓value ✓notation	(2)
5.6	$f'(x)=f(x-2)+5$ $f'(x)=2(x-2)^2-6+5$ $f'(x)=2x^2-8x+8-1$ $f'(x)=2x^2-8x+7$	✓substitution ✓answer	(2)
			[17]

QUESTION 6			
6.1	$\dfrac{\sin(x-180°).\tan(x+180°).\cos(90+x)}{\sin^2(180^\circ+x)}$ $=\dfrac{(-\sin x).(\tan x).(-\sin x)}{(-\sin x)^2}$ $=\dfrac{(-\sin x)^2(\tan x)}{(-\sin x)^2}$ $=\tan x$	✓-sinx ✓tanx ✓-sinx ✓-sinx ✓simplification ✓answer	(6)
6.2	$\cos 25° = \dfrac{\sqrt{1-k^2}}{1} = \dfrac{adj}{hyp}$ $opp = ?$ $(hyp)^2 = (opp)^2 + (adj)^2$ $(1)^2 = opp^2 + \left(\sqrt{1-k^2}\right)^2$ $opp^2 = k^2$ $opp = k$  		
6.2.1	$\sin 25° = \dfrac{opp}{hyp} = \dfrac{k}{1}$ $\sin 25° = k$	✓substitution ✓answer	(2)
6.2.2	$\sin 50° = \sin 2(25°) = 2\sin 25°\cos 25°$ $\sin 50° = k.\sqrt{1-k^2}$	✓sin2(25) ✓double angle ✓Answer	(3)
6.2.3	$\cos 70^\circ = \cos(45° + 25°)$ $= \cos 45°\cos 25° - \sin 25°\sin 45°$ $= \dfrac{\sqrt{2}}{2}.\dfrac{\sqrt{1-k^2}}{1} - \dfrac{k}{1}.\dfrac{\sqrt{2}}{2}$ $= \dfrac{\sqrt{2}.\sqrt{1-k^2} - \sqrt{2}k}{2}$	✓cos(45° + 25°) ✓compound angle formular ✓substitute first term ✓substitution in second term ✓Simplification	(5)

6.3	LHS $\frac{\sin 3\theta}{\sin\theta}-\frac{\cos 3\theta}{\cos\theta}=\frac{\sin 3\theta\cos\theta-\cos 3\theta\sin\theta}{\sin\theta\cos\theta}$ $=\frac{\sin(3\theta-\theta)}{\frac{1}{2}(2\sin\theta\cos\theta)}$ $=2.\frac{\sin 2\theta}{\sin 2\theta}=2$ $LHS=RHS$	✓sinxcosx ✓numerator ✓simplification ✓express denominator as double angle ✓simplification	(5)
6.4	$\cos(A+B)=\cos A\cos B-\sin A\sin B=m.....(1)$ $\cos(A-B)=\cos A\cos B+\sin A\sin B=n.....(2)$ $(1)+(2)$ $2\cos A\cos B=m+n$ $\cos A\cos B=\frac{m+n}{2}$	✓equation 1 ✓equation 2 ✓simplification	(3)
			[24]

QUESTION 7



	Given ΔABC with AC=b, AB=c and BC=a	✓construction	(4)

	RTP: $a^2 = b^2 + c^2 - 2bc\cos A$ Construction: draw perpendicular height *h* from vertex C perpendicular to B. Proof $\Delta ACD:\ b^2 = h^2 + AD^2$ $\Delta BCD: a^2 = h^2 + DB^2 = h^2 + (c - AD)^2$ $a^2 = h^2 + c^2 - 2c.AD + AD^2$ $a^2 = h^2 + AD^2 + c^2 - 2cAD$ $a^2 = b^2 + c^2 - 2cAD$ $\cos A = \frac{adj}{hyp} = \frac{AD}{b}$ $AD = b\cos A$ $a^2 = b^2 + c^2 - 2bc\cos A$	✓Pythagoras theorem for both triangles ✓substitute by *BD=c-AD* ✓cosA	
QESTION 8			
8.1	Area of $\Delta PQR = \frac{1}{2}(8)(12)\sin 110°$ Area of $\Delta PQR = 45.11$ square units	✓substitution ✓answer	(2)
8.2	$PR^2 = (8)^2 + (12)^2 - 2(8)(12)\cos 110°$ $PQ^2 = 273.67$ $PQ = 16.54$	✓substitution ✓simplification ✓answer	(3)
			[5]

TOTAL 100