KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA



NATIONAL SENIOR CERTIFICATE

GRADE 10

MATHEMATICS

COMMON TEST

JUNE 2022

MARKING GUIDELINE



MARKS: **100**

TIME: **2 hours**

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/answer in order to solve a problem is unacceptable.

This marking guideline consists of 9 pages.

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QUESTION 1

1.1	$\frac{1}{3}x^2y\left(6x-\frac{9}{2}x^{-2}y^2\right)$ $=2x^3y-\frac{3}{2}y^3$	✓ $2x^3y$ ✓ $-\frac{3}{2}y^3$	(2)
1.2	$(a+1)^2-4b^2$ $=\left[(a+1)-2b\right]\left[(a+1)+2b\right]$ $=(a+1-2b)(a+1+2b)$	✓ $(a+1-2b)$ ✓ $(a+1+2b)$	(2)
1.3.1	$(x+m)(x-n)=0$ $x=-m \quad or \quad x=n$	✓ $x=-m$ ✓ $x=n$	(2)
1.3.2	$4^x-4^0-255=0$ $4^x-1-255=0$ $4^x=256$ $2^{2x}=2^8$ $\therefore 2x=8$ $\therefore x=4$	✓ simplification ✓ prime base ✓ answer	(3)
1.4	$\frac{2^{x+2}.7}{2^{x+4}-6.2^{x+1}}$ $=\frac{2^x.2^2.7}{2^x.2^4-6.2^x.2^1}$ $=\frac{2^x.2^2.7}{2^x(2^4-6.2)}$ $=\frac{28}{4}$ $=7$	✓ $2^x.2^2.7$ ✓ $2^x.2^4-6.2^x.2^1$ ✓ common factor: 2^x ✓ answer	(4)
			[13]

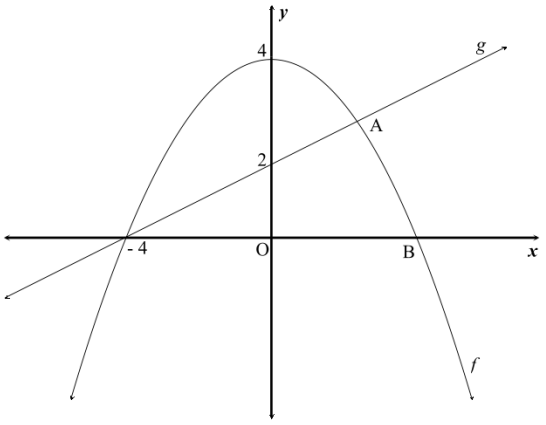
QUESTION 2

2.1.1	$\frac{1}{3}$; 1	✓ $\frac{1}{3}$ ✓ 1	(2)
2.1.2	$\frac{1}{-2n+5}=-\frac{1}{395}$ $-2n+5=-395$ $-2n=-400$ $n=200$	✓ substitution ✓ answer	(2)

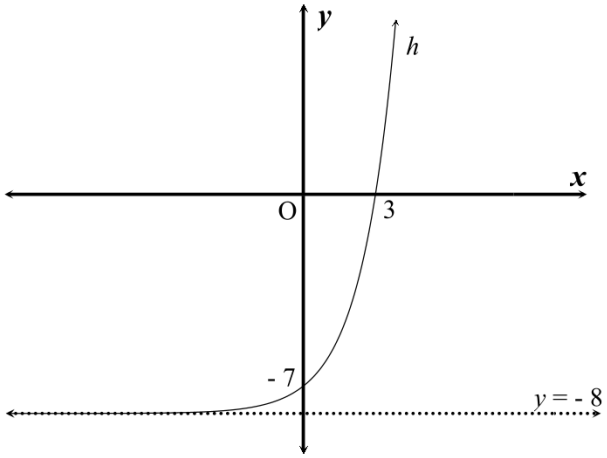
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2.2	$T_3 = \frac{2(3)+3}{(3)^2} = \quad a = 1$ $T_4 = \frac{2(4)+3}{(4)^2} = \quad b = \frac{11}{16}$ $T_6 = \frac{2(5)+3}{(5)^2} = \quad c = \frac{13}{25}$	✓ $a = 1$ ✓ $b = \frac{11}{16}$ ✓ $c = \frac{13}{25}$	(3)
2.3.1	2 ; 6 ; 12 ; 20 ; **30** 6 ; **12** ; 20 ; 30 ; **42** 7 ; 17 ; 31 ; 49 ; **71**	✓ $a = 30$ ✓ $b = 12$ ✓ $c = 42$ ✓ $d = 71$	(4)
2.3.2	$T_n = n(n+1)$ $T_{50} = 50(50+1)$ $T_{50} = 2550cm^2$	✓ answer	(1)
			[12]

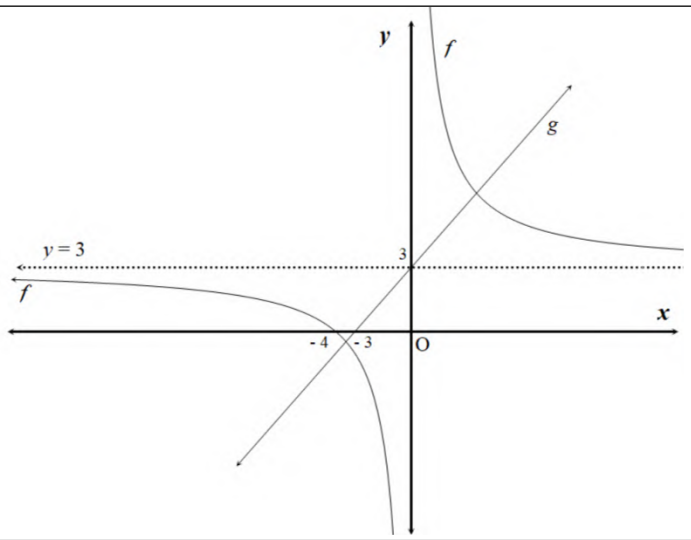
QUESTION 3

3.1			
3.1.1	$g(x) = \frac{1}{2}x + 2$	✓ gradient ✓ y intercept	(2)
3.1.2	$q = 4$ $y = ax^2 + 4$ *sub* $(-4;0) \rightarrow \quad 0 = a(-4)^2 + 4$ $a = \frac{-4}{16} = -\frac{1}{4}$	✓ $q = 4$ ✓ substitution ✓ $a = -\frac{1}{4}$	(3)
3.1.3	$B(4;0)$	✓ answer	(1)
3.1.4	$y \leq 4$ *or* $y \in (-\infty;4]$	✓ values ✓ notation	(2)
3.1.5	$k(x) = \frac{1}{4}x^2 - 4$	✓ $\frac{1}{4}$ ✓ -4	(2)
3.1.6	$x = 4$ or $x = -4$	✓ either value	(1)

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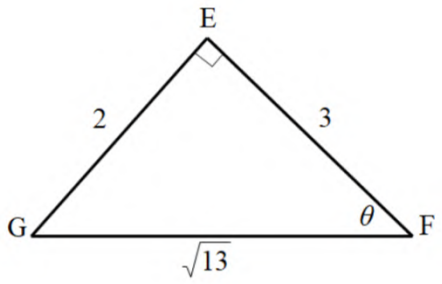
3.1.7	$-4 < x < 2$ *or* $x \in (-4;2)$	✓ values ✓ notation	(2)
3.2		✓ shape: increasing ✓ intercepts ✓ asymptote	(3)
			[16]

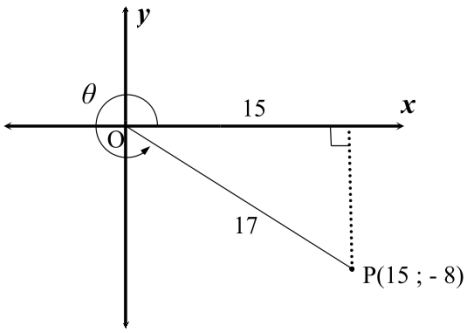
QUESTION 4

4.1	$x = 0$ $y = 3$	✓ answer ✓ answer	(2)
4.2	$y = x + c$ *sub* $(0;3) \rightarrow \quad y = x + 3$	✓ gradient = +1 ✓ y-intercept: (0;3)	(2)
4.3		*f*: ✓ shape: increasing ✓ x-intercept ✓ asymptote $y = 3$ ✓ *g*: x- and y- intercepts	(4)
			[8]

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QUESTION 5



5.1.1	$\tan\theta = \frac{EG}{EF} = \frac{2}{3}$	✓ answer	(1)
5.1.2	$\text{cosec}\,\theta = \frac{GF}{GE} = \frac{\sqrt{13}}{2}$	✓ answer	(1)
5.1.3	$\cos(90° - \theta) = \text{cosG} = \frac{2}{\sqrt{13}}$	✓ answer	(1)
5.2			
5.2.1	$\cos\theta = \frac{15}{17}$ $\therefore OP = 17\ units$	✓ answer	(1)
5.2.2	$y^2 = 17^2 - 15^2$ $y^2 = 64$ $\therefore y = -8 \qquad (4th\ \text{quadrant})$. $\therefore \tan\theta = \frac{y}{x} = \frac{-8}{15}$	✓ $y = -8$ ✓ answer	(2)
5.2.3	LHS: $\cos^2\theta + \sin^2\theta$ $= \left(\frac{15}{17}\right)^2 + \left(\frac{-8}{17}\right)^2$ $= \frac{289}{289}$ $= 1$ $= RHS$ $\therefore \cos^2\theta + \sin^2\theta = 1$	✓ substitution ✓ $\frac{289}{289} = 1$	(2)
			[8]

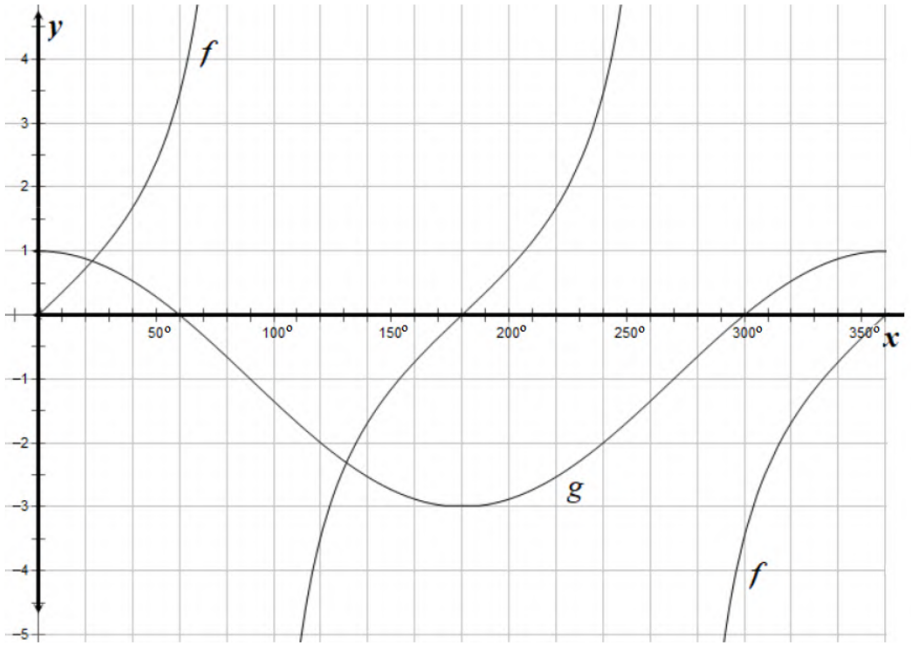
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QUESTION 6

6.1.1	$\cos^3 x - \sin^2 x$ $= \cos^3 15° - \sin^2 15°$ $= 0,83$	Answer only: full marks	✓ substitution ✓ answer (2)
6.1.2	$\frac{5\sec 2y}{\cot x}$ $= \frac{5\sec 2(22,5°)}{\cot 15°}$ $= \frac{5\tan 15°}{\cos 2(22,5°)}$ $= 1,89$	Answer only: full marks	✓ substitution ✓ answer (2)
6.1.3	$\sqrt{\text{cosec}(y-x)}$ $= \sqrt{\frac{1}{\sin(22,5° - 15°)}}$ $= 2,77$	Answer only: full marks	✓ substitution ✓ answer (2)
6.2.1	$\tan 2x = 1,01$ $2x = 45,28505....$ $x = 22,6°$	Penalty for incorrect rounding in this question **only**.	✓ 45,28505... ✓ answer (2)
6.2.2	$\frac{\sin(2x - 20°)}{3} = 0,099$ $\sin(2x - 20°) = 0,297$ $2x - 20° = 17,2775...$ $x = 18,6°$		✓ 0,297 ✓ 7,2775... ✓ answer (3)
6.3	$\frac{\sin 60°.\sec 30° + \tan^2 60°}{2\tan 45°}$ $= \frac{\frac{\sqrt{3}}{2}.\frac{2}{\sqrt{3}} + (\sqrt{3})^2}{2.1}$ $= \frac{1+3}{2}$ $= 2$	Answer only: max. 1/5	✓ $\frac{\sqrt{3}}{2}$ ✓ $\frac{2}{\sqrt{3}}$ ✓ $\sqrt{3}$ ✓ $\tan 45° = 1$ ✓ answer (5)
			[16]

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QUESTION 7

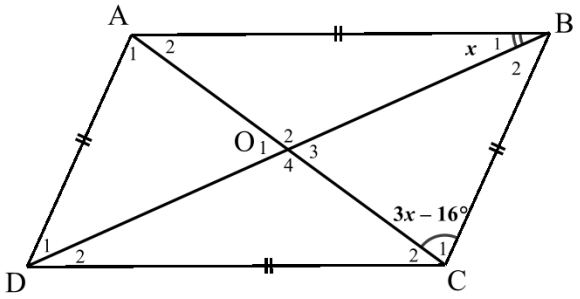


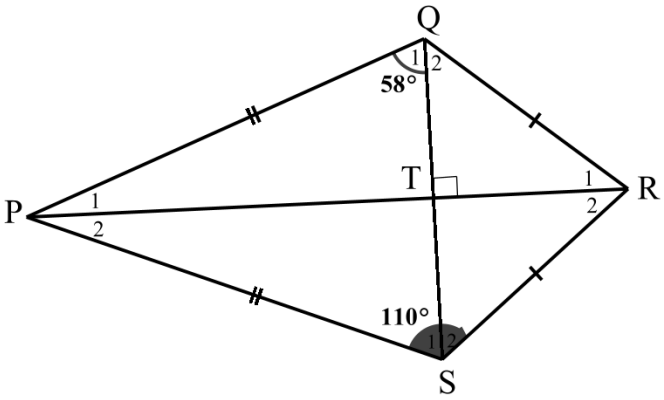
7.1	$a = 2$ $p = -1$	✓ answer ✓ answer	(2)
7.2.1	*amplitude of* $g = 2$	✓ answer	(1)
7.2.2	$y \in R$ *or* $y \in (-\infty; \infty)$	✓ answer ✓ answer	(1) (1)
7.2.3	*period of* $f = 180°$	✓ answer	(1)
7.3	2 *solutions*	✓ answer	(1)
			[6]

GEOMETRY	
S	**A mark for a correct statement** **(A statement mark is independent of a reason.)**
R	**A mark for a correct reason** **(A reason mark may only be awarded if the statement is correct.)**
S/R	**Award a mark if the statement AND reason are both correct.**

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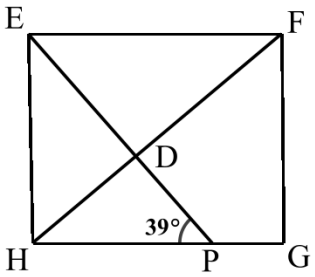
QUESTION 8

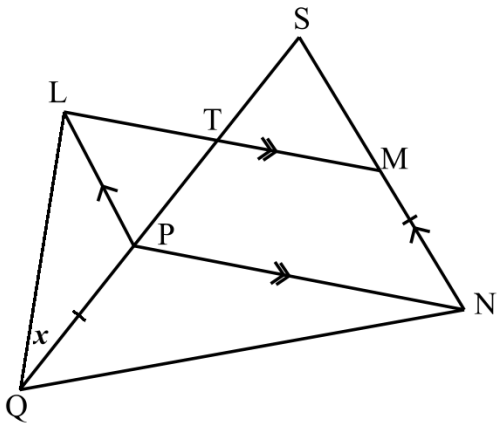


8.1.1	$\hat{O}_3 = 90°$ (diags of rhombus)	✓ S	(1)
8.1.2	*In* ΔBOC: $\hat{O}_3 = 90°$ (diags of rhombus) $\hat{B}_1 = \hat{B}_2 = x$ (diags of rhombus) $\hat{C}_1 = 3x - 16°$ (given) $\therefore\ 3x - 16° + x + 90° = 180°$ (sum ∠s Δ) $\therefore\ x = 26,5°$	✓ S/R ✓ S/R ✓ S	(3)
8.1.3	$\hat{A}_1 = \hat{C}_1 = 3x - 16°$ (alt ∠s; AD // BC) $\therefore \hat{A}_1 = 3(26,5°) - 16° = 63,5°$	✓ S/R ✓ S	(2)
8.2			
8.2.1	*In* ΔPQT: $Q\hat{T}P = 90°$ (diags of kite) $\therefore \hat{P}_1 = 180° - 58° - 90°$ (sum ∠s Δ) $\therefore \hat{P}_1 = 32°$	✓ S/R ✓ S/R	(2)
8.2.2	*In* ΔPRS: $P\hat{S}R = 110°$ (given) $\therefore \hat{P}_1 = \hat{P}_2 = 32°$ (diags of kite) $\therefore \hat{R}_2 = 180° - 110° - 32°$ (sum ∠s Δ) $\therefore \hat{R}_2 = 38°$	✓ S ✓ R ✓ S/R	(3)
			[11]

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QUESTION 9



9.1	In ΔEDF: $F\hat{E}P = 39^o$ (alt $\angle$s; EF // HG) $E\hat{F}H = 45^o$ (diags of square) $\therefore E\hat{D}F = 180^o - 45^o - 39^o$ (sum $\angle$s Δ) $\therefore E\hat{D}F = 96^o$	✓ S ✓ R ✓ S/R ✓ S/R	(4)
	 	 	
9.2	*n paralle*log*ram LMNP* $MN = LP$ (*opp sides of parm* *but* $PQ = MN$ $\therefore LP = PQ$ $\therefore Q\hat{L}P = x$ $\therefore L\hat{P}S = 2x$ (*ext* $\angle \Delta LPQ$) $L\hat{P}S = Q\hat{S}N = 2x$ (*alt* $\angle s$; LP // Mn *and* $L\hat{Q}S = x$ (*given*) $\therefore Q\hat{S}N = 2L\hat{Q}S$	✓ S/R ✓ S ✓ S/R ✓ S ✓ R	(5)
			[9]
		TOTAL:	**100**



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