Province of the
EASTERN CAPE
EDUCATION

NATIONAL
SENIOR CERTIFICATE

GRADE 10

NOVEMBER 2019

MATHEMATICS P2
MARKING GUIDELINE (EXEMPLAR)

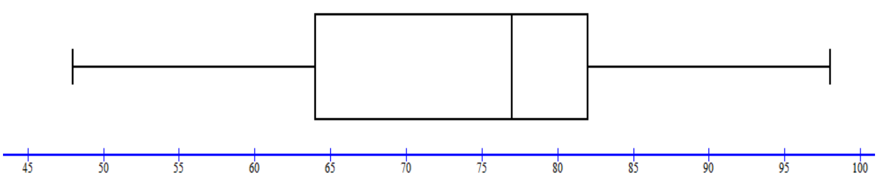
MARKS: 100

This marking guideline consists of 8 pages.

Consistent accuracy (CA) marking, applies in ALL aspects of the marking guideline.

QUESTION 1

48	50	52	59	60	68	73	76	76	76
78	79	80	81	82	82	84	91	92	98

1.1.1	Median $= \dfrac{76+78}{2} = 77$	✓ answer (1)
1.1.2	Lower quartile $= \dfrac{60+68}{2} = 64$ Upper quartile $= 82$	✓ lower quartile ✓ upper quartile (2)
1.1.3	Interquartile range (IQR) $= Q_3 - Q_1$ $= 82 - 64 = 18$	✓ substitution ✓ answer (2)
1.1.4	Min = 48 and max = 98	✓ min and max (1)
1.1.5		✓ min and max ✓ Q_1 and Q_3 ✓ Q_2 (3)
1.1.6	Skewed to the left or negatively skewed	✓ answer (1)

1.2

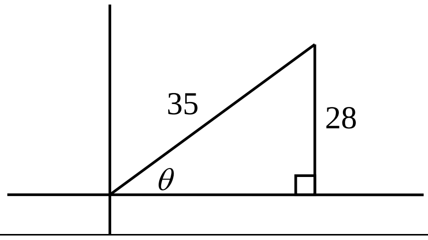
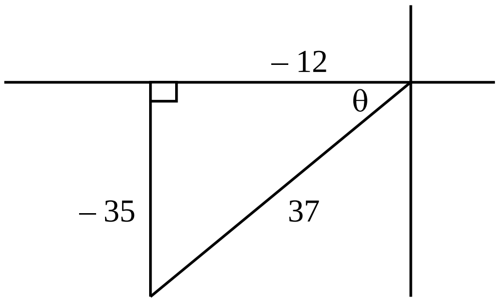
Duration (min)	No of calls (f_1)	Midpoint (x_1)	(f_1) × (x_1)
$2 \leq t < 5$	47	3,5	164,5
$5 \leq t < 8$	139	6,5	903,5
$8 \leq t < 11$	211	9,5	2004,5
$11 \leq t < 14$	102	12,5	1275
$14 \leq t < 17$	58	15,5	899
$17 \leq t < 20$	19	**A**	**B**
	576		5598

1.2.1	**A** = 18,5 and **B** = 351,5	✓ answer of A ✓ answer of B (2)
1.2.2	approximate mean $= \dfrac{sum\ of\ f_1 \times x_1}{sum\ of\ f_1}$ $= \dfrac{5598}{576}$ $= 9,7$ minutes	✓ sum of all $(f_1)\times(x_1)$ ✓ sum of all (f_1) ✓ answer (3)
1.2.3	75^{th} percentile lie $= \dfrac{75}{100} \times 576 = 432$ In the interval $11 \leq t < 14$	✓ 432 ✓ interval (2)
		[17]

QUESTION 2

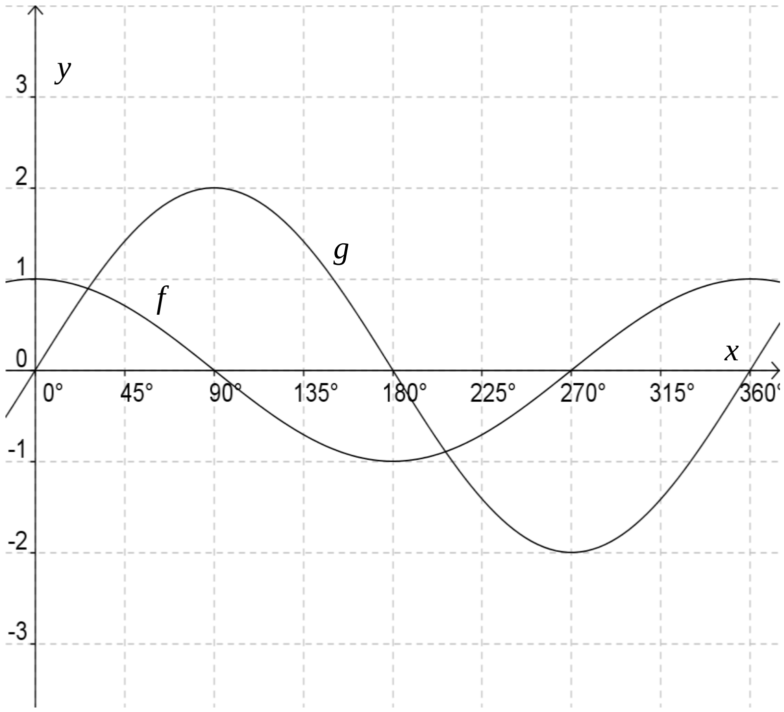
2.1	A(– 2 ; 6) , B(6 ; 8) and C(4 ; 0) $d_{AB} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(6-(-2))^2 + (8-6)^2}$ $= 2\sqrt{17}$ $d_{BC} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(4-6)^2 + (0-8)^2}$ $= 2\sqrt{17}$ $\therefore$ AB = BC.	✓ formula ✓ substitution ✓ distance AB ✓ substitution ✓ distance of BC (5)
2.2	ABCD is a kite adjacent sides are equal	✓ kite ✓motivation (2)
2.3	A(– 2 ; 6) , B(6 ; 8) and C(4 ; 0) Midpoint of BC = $\left(\frac{x_2 + x_1}{2} ; \frac{y_2 + y_1}{2}\right)$ $= (\frac{-2+6}{2} ; \frac{8+6}{2})$ = G(2 ; 7) Midpoint of AB = $\left(\frac{x_2 + x_1}{2} ; \frac{y_2 + y_1}{2}\right)$ $= (\frac{4+6}{2} ; \frac{0+8}{2})$ = H(5 ; 4)	✓ formula ✓ substitution ✓ coordinates of G, mdpt of BC ✓ substitution ✓ coordinates of H, mdpt of AB (5)
2.4	$B\hat{A}D = B\hat{C}D$ (opposite ∠'s of a kite are =) $A\hat{E}H = E\hat{D}B$ (corresponding ∠'s , EG || DB) but $E\hat{D}B = B\hat{D}C$ (diagonals of a kite) $\therefore A\hat{E}G = B\hat{D}C$ $\therefore$ΔAEG ||| ΔCDB. (A A A)	✓ S ✓R ✓ SR ✓ 3rd angle or reason (4)
		[16]

QUESTION 3

3.1.1	$x^2 = 35^2 - 28^2$ $x = 21$ $\therefore \cos\theta = \dfrac{21}{35}$  	✓sub in Pythagoras ✓$x = 21$ ✓ $\dfrac{21}{35}$ (3)
3.1.2	$\sin^2\theta + \cos^2\theta = \left(\dfrac{28}{35}\right)^2 + \left(\dfrac{21}{35}\right)^2$ $= 1$ $=$ RHS	✓ $\left(\dfrac{28}{35}\right)^2$ ✓ $\left(\dfrac{21}{35}\right)^2$ ✓ 1 (3)
3.2	If $37\sin\theta + 35 = 0$ $\therefore \sin\theta = -\dfrac{35}{37}$ $x^2 = 37^2 - 35^2$ $x = 12$  $24\sec\theta - 70\cot\theta$ $= 24(\dfrac{37}{-12}) - 70(\dfrac{-12}{-35})$ $= -74 - 24$ $= -98$	✓ $\sin\theta = \dfrac{-35}{37}$ ✓ 3rd quadrant ✓ x value = – 12 ✓✓ substitution ✓answer (6)
3.3.1	$8\cos(x + 10°) = 5$ $\cos(x + 10°) = \dfrac{5}{8}$ $x + 10° = 51{,}32°$ $x = 41{,}32°$	✓$\cos(x + 10°)$ ✓ $x + 10°$ ✓ answer (3)

3.3.2	$\text{cosec } 2x = 2$ $\sin 2x = \frac{1}{2}$ $2x = 30^0$ $x = 15^0$	✓ $\sin 2x = \frac{1}{2}$ ✓ $2x = 30°$ ✓ answer (3)
3.4	$\frac{\sin 30° \times \tan 60°}{\tan 30° \times \cos 60°} = \frac{\frac{1}{2} \times \frac{\sqrt{3}}{1}}{\frac{1}{\sqrt{3}} \times \frac{1}{2}}$ $= 3$ $= \text{RHS}$	✓ $\frac{1}{2}$ ✓ $\sqrt{3}$ ✓ $\frac{1}{\sqrt{3}}$ ✓ $\frac{1}{2}$ ✓ answer (5)
3.5.1	$\sin 55° = \frac{x}{15}$ $x = 15 \times \sin 55°$ $= 12{,}29°$ **OR** $\cos 35° = \frac{x}{15}$ $x = 12{,}29°$	✓ using $\sin 55°$ ✓ answer (2) ✓ using $\cos 35°$ ✓ answer (2)
3.5.2	$\tan 21° = \frac{4{,}4}{y}$ $y = \frac{4{,}4}{\tan 21°}$ $= 11{,}46$ **OR** $\tan 69° = \frac{y}{4{,}4}$ $y = 11{,}46$ **OR** $y^2 = 12{,}29^2 - 4.4^2$ $y = 11{,}48$	✓ using $\tan 21°$ ✓ answer (2) ✓ Pythagoras ✓ answer (2)
		[27]

QUESTION 4

4.1		✓ intercepts ✓ turning pts ✓ shape (3)
4.2	period of g = 360^0	✓ answer (1)
4.3	range of *m(x)* if $m(x) = -3f(x) + 1$ range of -3 f(x): $-3 \leq y \leq 3$ range of *m(x)* : $-2 \leq y \leq 4$	✓ notation ✓✓ endpoints (3)
4.4	g decreasing: $90^0 < x < 270^0$	✓ notation ✓ endpoints (2)
4.5	$f(x) \times g(x) < 0$ $90° < x < 180°$ or $270° < x\ 360°$	✓ notation ✓ endpoints ✓ endpoints (3)
		[12]

QUESTION 5

5.1	$A\hat{D}C = 53°$ (∠s on a straight line) $D\hat{C}B = 116°$ (supplementary adj ∠s) $C\hat{B}A = 101°$ (∠s on a straight line) $B\hat{A}D = 360° - 53° - 116° - 101°$ $= 90°$ (∠s of a quad = $360°$) Answer only: full marks, provided one reason is given	✓ SR ✓SR ✓SR ✓ answer (4)
5.2	Let $D\hat{E}B = y$ and $F\hat{E}C = k$ $\therefore\ \hat{B} = 180° - 2y$ and $\hat{C} = 180° - 2k$ (∠s of a Δ = 180°) In Δ ABC: $x + 180° - 2y + 180° - 2k = 180^0$ $2y + 2k = x + 180° + 180° - 180°$ $y + k = \frac{1}{2}x + 90°$ $D\hat{E}F = 90° - \frac{1}{2}x$ (∠s on a straight line)	✓ SR ✓ SR ✓ S ✓ SR (4)
		[8]

QUESTION 6

6.1.1	AP = DE and AQ = DF (given) $\hat{A} = \hat{D}$ (given) Δ APQ ≡ Δ DEF (SAS)	✓ given ✓Δ's similar ✓ reason (3)
6.1.2	$A\hat{P}Q = \hat{E}$ (Δ APQ ≡ Δ DEF) But $\hat{B} = \hat{E}$ (given) $\therefore\ A\hat{P}Q = \hat{B}$ $\therefore$ PQ ∣∣ BC (a pair of corresponding ∠s are =)	✓ Statement ✓ Statement ✓ Reason (3)
6.1.3	$\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$ (ΔABC ∣∣∣ ΔDEF) $\frac{7,5}{3,5} = \frac{8}{DF}$ $DF = \frac{8 \times 3,5}{7,5}$ $= 3,7$	✓ SR ✓ substitution ✓ simplification ✓ answer (4)
6.2.1	Converse of midpoint theorem	✓ answer (1)

6.2.2	BD = $\sqrt{32}$ $\therefore$ AD = $\sqrt{32}$ $\therefore$ EF = $\sqrt{32}$ (opp sides of a parallelogram) $\therefore$ CG = $2\sqrt{32}$ (midpt theorem) = $8\sqrt{2}$	✓ BD = AD ✓S✓R ✓ SR ✓ answer (5)
		[16]

QUESTION 7

TSA of cone = TSA of hemisphere $\pi r^2 + \pi r s = 3\pi r^2$ $\pi r s = 2\pi r^2$ $s = 2x \quad (r = x)$ but $s^2 = h^2 + x^2$ $\therefore h^2 + x^2 = 4x^2$ $\therefore h = \sqrt{4x^2 - x^2}$ $= \sqrt{3}x$	✓ equating the TSA ✓ use of Pythagoras ✓ substituting $s = 2x$ ✓ h subject of formula (4)
	[4]
TOTAL:	**100**