basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS
SENIORSERTIFIKAAT-EKSAMEN

MATHEMATICS P2/*WISKUNDE V2*

2018

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS: 150
PUNTE: 150

These marking guidelines consist of 21 pages.
Hierdie nasienriglyne bestaan uit 21 bladsye.

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 memorandum. Stop marking at the second calculation error.
- Assuming answers/values in order to solve a problem is NOT acceptable.

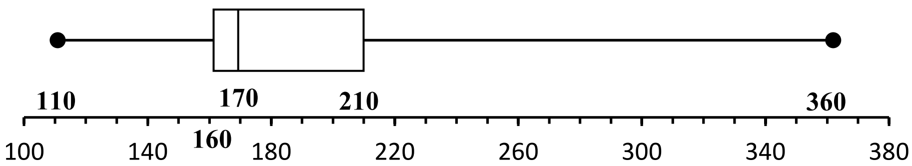
LET WEL:

- *As 'n kandidaat 'n vraag TWEE KEER beantwoord, sien slegs die EERSTE poging na.*
- *As 'n kandidaat 'n antwoord van 'n vraag doodtrek en nie oordoen nie, sien die doodgetrekte poging na.*
- *Volgehoue akkuraatheid word in ALLE aspekte van die nasienriglyne toegepas. Hou op nasien by die tweede berekeningsfout.*
- *Aanvaar van antwoorde/waardes om 'n probleem op te los, word NIE toegelaat nie.*

GEOMETRY	
S	**A mark for a correct statement** **(A statement mark is independent of a reason.)**
	'n Punt vir 'n korrekte bewering **('n Punt vir 'n bewering is onafhanklik van die rede.)**
R	**A mark for a correct reason** **(A reason mark may only be awarded if the statement is correct.)**
	'n Punt vir 'n korrekte rede **('n Punt word slegs vir die rede toegeken as die bewering korrek is.)**
S/R	**Award a mark if the statement AND reason are both correct.**
	Ken 'n punt toe as beide die bewering EN rede korrek is.

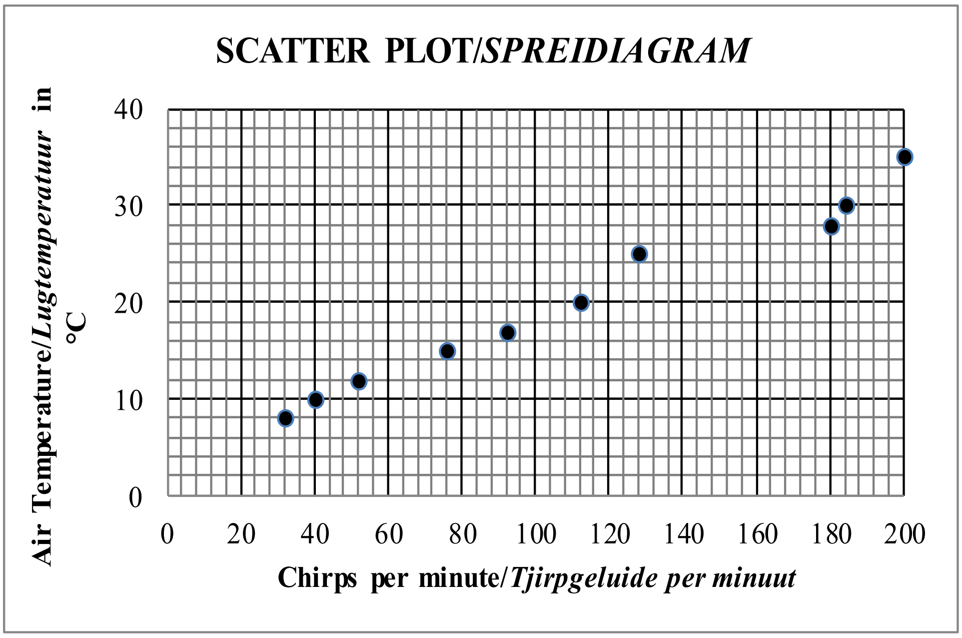
QUESTION/*VRAAG* 1

110	112	156	164	167	169
171	176	192	228	278	360

1.1.1	Mean/*Gemiddelde* $= \frac{2283}{12}$ $= 190,25$ Mean profit/*Gemiddelde wins* $=$ R190 250,00 or 190,25 thousand rands	✓ sum/*som* ✓ answer ✓ answer in thousands of rands (3)
1.1.2	Median $= \frac{169+171}{2} = 170$ thousand rands = R170 000	✓ answer (1)
1.2		✓ whiskers ✓ quartiles (2)
1.3	IQR $= Q_3 - Q_1$ = 210 – 160 thousand rands = R50 000	✓ answer (1)
1.4	Skewed to the right or positively skewed.	✓ answer (1)
1.5.1	$\sigma = 67,04118759$ thousand rands = R67 041,19	✓ answer (1)
1.5.2	$\bar{x} - \sigma = 123,21$ thousand rands For **2** months the profit was less than one standard deviation below the mean.	✓ lower limit ✓ answer (2)
		[11]

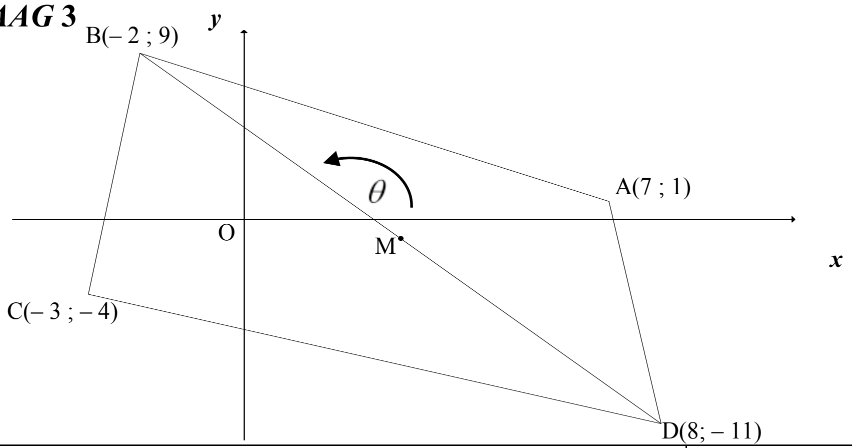
QUESTION/*VRAAG* 2

CHIRPS/*TJIRPGELUIDE* PER MINUTE/ *PER MINUUT*	AIR TEMPERATURE/ *LUGTEMPERATUUR* IN °C
32	8
40	10
52	12
76	15
92	17
112	20
128	25
180	28
184	30
200	35

2.1		3 marks: All points correct 2 marks: 6 – 9 points correct 1 mark: 3 – 5 points correct (3)
2.2	The points lie almost in a straight line. This suggests a very strong positive relationship between the number of chirps per minute and the temperature of the air. *Die punte lê amper in 'n reguitlyn, wat beteken dat daar 'n baie sterk positiewe verband tussen die aantal tjirpgeluide per minuut en die lugtemperatuur is.* **OR/*OF*** $r = 0{,}99$ so there is a very strong positive relationship between the number of chirps per minute and the temperature of the air. $r = 0{,}99$, *dus is daar 'n baie sterk positiewe verband tussen die aantal kriekgeluide per minuut en die lugtemperatuur.*	✓ justify with straight line / *Motivering mbv reguitlyn* (1) ✓ link with / *gebruik* $r = 0{,}99$ *om te motiveer* (1)

2.3	$a = 3{,}97$ $b = 0{,}15$ $\hat{y} = 3{,}97 + 0{,}15x$	✓ $a = 3{,}97$ ✓ $b = 0{,}15$ ✓ equation (3)
2.4	Air temperature $\approx$ 15,67°C (calculator) **OR** $\hat{y} \approx 3{,}97 + 0{,}15(80)$ $\approx$ 15,97°C **OR** Air temperature $\approx$ 16°C (graph: Accept between 15°C and 17°C)	✓✓ answer (2) ✓ substitution ✓ answer (2) ✓✓ answer (2)
		[9]

QUESTION/*VRAAG* 3

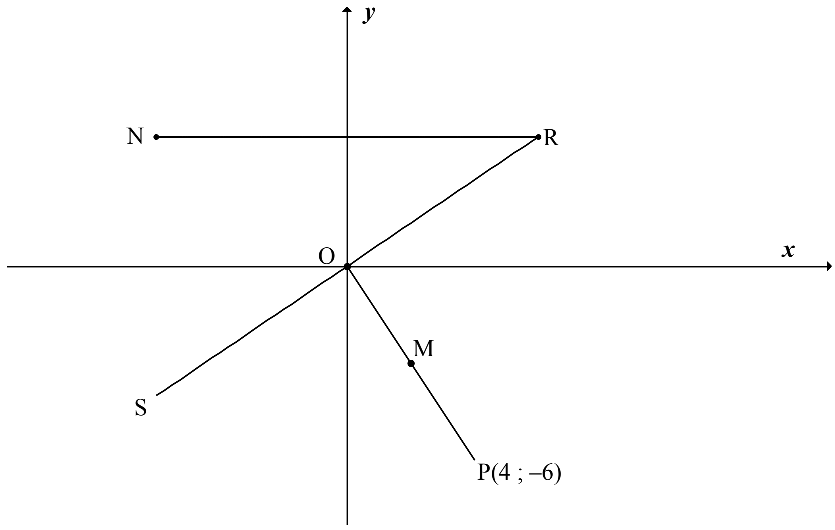


3.1	$m_{AC} = \dfrac{1-(-4)}{7-(-3)}$ *OR* $\dfrac{-4-1}{-3-7}$ $= \dfrac{5}{10} = \dfrac{1}{2}$	✓ substitution ✓answer (2)
3.2.1	$y = \frac{1}{2}x + c$ $y - y_1 = \frac{1}{2}(x - x_1)$ $1 = \frac{1}{2}(7) + c$ $y - 1 = \frac{1}{2}(x - 7)$ $c = -\frac{5}{2}$ **OR/*OF*** $y - 1 = \frac{1}{2}x - \frac{7}{2}$ $y = \frac{1}{2}x - 2\frac{1}{2}$ $y = \frac{1}{2}x - 2\frac{1}{2}$ **OR/*OF*** $y = \frac{1}{2}x + c$ $y - y_1 = \frac{1}{2}(x - x_1)$ $-4 = \frac{1}{2}(-3) + c$ $y - (-4) = \frac{1}{2}(x - (-3))$ $c = -\frac{5}{2}$ **OR/*OF*** $y + 4 = \frac{1}{2}x + \frac{3}{2}$ $y = \frac{1}{2}x - 2\frac{1}{2}$ $y = \frac{1}{2}x - 2\frac{1}{2}$	✓ substitution M and A(7 ; 1) ✓equation (2) ✓ substitution M and C(–3 ; –4) ✓equation (2)

3.2.2	$M\left(\frac{-2+8}{2}\ ;\ \frac{9+(-11)}{2}\right)$ $\therefore M(3;-1)$ Equation of AC: $y=\frac{1}{2}x-2\frac{1}{2}$ **OR/OF** $y=\frac{1}{2}x-2\frac{1}{2}$ $y=\frac{1}{2}(3)-2\frac{1}{2}$ $-1=\frac{1}{2}x-2\frac{1}{2}$ $y=-1$ $x=3$ $\therefore$ M lies on AC **OR/OF** $M\left(\frac{-2+8}{2}\ ;\ \frac{9+(-11)}{2}\right)$ $\therefore M(3;-1)$ $m_{CM}=\frac{-4+1}{-3-3}=\frac{1}{2}$ $\therefore$ $m_{CM}=m_{AC}$ and C a common point $\therefore$ M lies on AC	✓x coordinate ✓y coordinate ✓ substitution of x ✓ conclusion (4) ✓ x coordinate ✓ y coordinate ✓ gradient of CM ✓ reasoning & conclusion (4)
3.3	$m_{BD}=\frac{9-(-11)}{-2-8}$ OR $\frac{(-11)-9}{8-(-2)}$ $=-2$ $m_{BD}\times m_{AC}=\frac{1}{2}\times-2$ $=-1$ $\therefore BD\perp AC$	✓ correct substitution ✓ m_{BD} ✓ product of gradients = –1 (3)
3.4.1	$\tan\theta=m_{BD}=-2$ $\therefore\theta=116{,}57°$	✓ $\tan\theta=m_{BD}$ ✓ answer (2)
3.4.2	$\tan\beta=m_{BC}$ $m_{BC}=\frac{9-(-4)}{-2-(-3)}$ *OR* $\frac{-4-9}{-3-(-2)}$ $=13$ $\beta=85{,}6°$ $\therefore C\hat{B}D=116{,}57°-85{,}60°$ [ext ∠ of Δ] $=30{,}97°$ **OR/OF** $BD=\sqrt{500}$; $BC=\sqrt{170}$ & $CD=\sqrt{170}$ $CD^2=BD^2+BC^2-2BD.BC.\cos C\hat{B}D$ $170=500+170-2\sqrt{500}.\sqrt{170}.\cos C\hat{B}D$ $\cos C\hat{B}D=\frac{\sqrt{500}}{2\sqrt{170}}=0{,}85749...$ $C\hat{B}D=30{,}96°$	✓ $m_{BC}=13$ ✓ value of β ✓ answer (3) ✓ subst into cos rule ✓ value of $\cos C\hat{B}D$ ✓ answer (3)

3.4.3	$AC=\sqrt{(x_1-x_2)^2+(y_1-y_2)^2}$ $=\sqrt{(7-(-3))^2+(1-(-4))^2}$ *OR* $\sqrt{((-3)-7)^2+((-4)-1)^2}$ $=\sqrt{100+25}$ $=\sqrt{125}=5\sqrt{5}=11,58$	✓ correct substitution into distance formula ✓ answer (2)
3.4.4	$BM=\sqrt{((-2)-3)^2+(9-(-1)^2}$ *OR* $\sqrt{(3-(-2))^2+((-1)-9)^2}$ $=\sqrt{125}=5\sqrt{5}$ Area of $\Delta ABC=\frac{1}{2}\text{base}\times\perp\text{ height}$ $=\frac{1}{2}(\sqrt{125})(\sqrt{125})$ = 62,5 square units Area of ABCD = 2 × 62,5 = 125 square units	✓ correct substitution into distance formula ✓ BM ✓ substitution into area formula ✓ 62,5 ✓ 2 × ΔABC (5)
		[23]

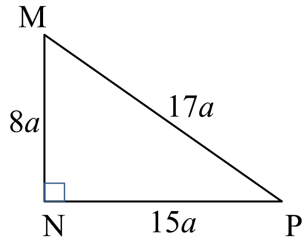
QUESTION/*VRAAG* 4



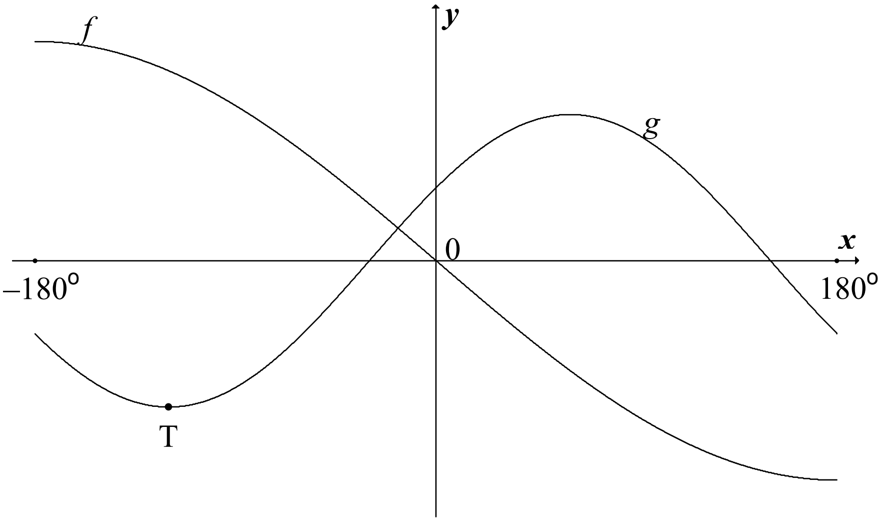
4.1	$M\left(\frac{0+4}{2}\,;\,\frac{0+(-6)}{2}\right)$ $\therefore M(2\,;-3)$	✓ 2 ✓ – 3 (2)
4.2.1	$x^2+y^2=4^2+(-6)^2$ $=52$ $\therefore x^2+y^2=52$	✓ substitution ✓ equation (2)
4.2.2	$(x-2)^2+(y+3)^2=\left(\frac{\sqrt{52}}{2}\right)^2=13$ $x^2-4x+4+y^2+6y+9-13=0$ $x^2+y^2-4x+6y=0$	✓ substitution of M ✓ substitution of radius = $\frac{\sqrt{52}}{2}$ ✓ answer (3)
4.2.3	$m_{OP}=\frac{-6}{4}=-\frac{3}{2}$ $m_{RS}\times m_{OP}=-1$ [radius ⊥ tangent / *raaklyn*] $\therefore m_{RS}=\frac{2}{3}$ $\therefore y=\frac{2}{3}x$	✓ m_{OP} ✓ m_{RS} ✓ equation (3)

4.3	$x^2 + y^2 = 52$ *and* $y = \frac{2}{3}x$ $x^2 + \left(\frac{2}{3}x\right)^2 = 52$ $x^2 + \frac{4}{9}x^2 = 52$ $1\frac{4}{9}x^2 = 52$ $x^2 = 36$ $x = 6$ $\therefore$ R(6 ; 4) and N(–6 ; 4) $\therefore$ NR = 12 units	✓ substitution ✓ simplification ✓ value of x ✓ length of NR (4)
4.4	Let T(x ; 0) be the other x intercept of the small circle Then OT is the common chord $\therefore (x-2)^2 + (0+3)^2 = 13$ $(x-2)^2 = 13 - 9 = 4$ $x - 2 = \pm 2$ $x = 2 \pm 2$ $x = 4$ *or* 0 OR $x^2 - 4x + 4 + 9 = 13$ $x^2 - 4x = 0$ $x(x-4) = 0$ $x = 0$ or $x = 4$ $\therefore$ length of common chord = OT = 4 units	✓ $y = 0$ ✓ x-values ✓ answer (3) **[17]**

QUESTION/*VRAAG* 5

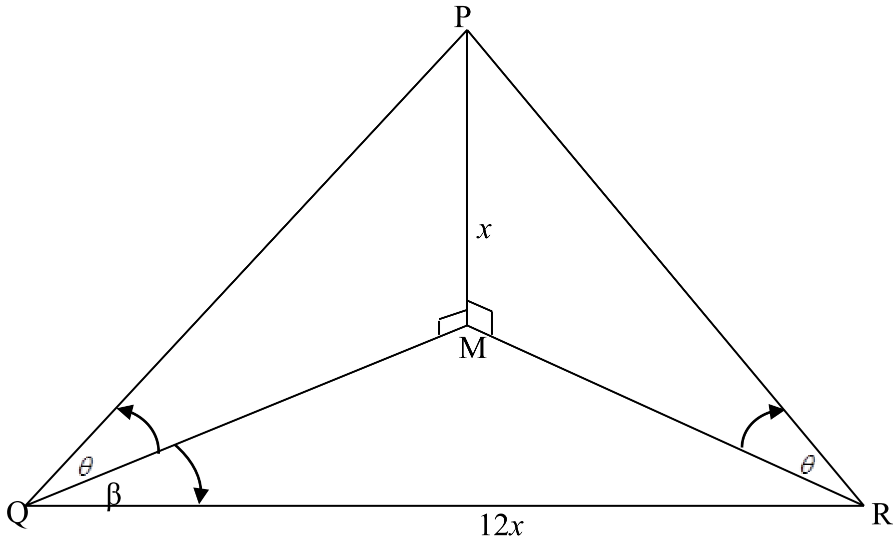
5.1.1	Given : $\sin \text{M} = \frac{15}{17}$ $\text{MN}^2 = 17^2 - 15^2$ $= 64$ $\text{MN} = 8$ OR  $\therefore \tan \text{M} = \frac{15}{8}$	✓ sketch or Pyth ✓ MN = 8 ✓answer (3)
5.1.2	$\sin \text{M} = \frac{\text{NP}}{\text{MP}}$ $\frac{\text{NP}}{51} = \frac{15a}{17a}$ $\therefore \text{NP} = 45$	✓ equating trig ratios ✓ answer (2)
5.2	$\cos(x - 360°).\sin(90° + x) + \cos^2(-x) - 1$ $= \cos x \,.\, \cos x + \cos^2 x - 1$ $= \cos^2 x + \cos^2 x - 1$ $= 2\cos^2 x - 1$ $= \cos 2x$	✓ $\cos x$ ✓ $\cos x$ ✓ $\cos^2 x$ ✓ identity (4)
5.3.1	$\sin(2x + 40°)\cos(x + 30°) - \cos(2x + 40°)\sin(x + 30°)$ $= \sin[(2x + 40°) - (x + 30°)]$ $= \sin(x + 10°)$	✓ reduction ✓ answer (2)
5.3.2	$\sin(2x + 40°)\cos(x + 30°) - \cos(2x + 40°)\sin(x + 30°) = \cos(2x - 20°)$ $\therefore \cos(2x - 20°) = \sin(x + 10°)$ $\cos(2x - 20°) = \cos[90° - (x + 10°)]$ $2x - 20° = 80° - x + k.360°$ or $2x - 20° = 360° - (80° - x) + k.360°$ $3x = 100° + k.360°$ or $2x - 20° = 280° + x + k.360°$ $x = 33{,}33° + k.120°$ or $x = 300° + k.360°$; $k \in Z$ **OR/*OF*** $\therefore \cos(2x - 20°) = \sin(x + 10°)$ $\sin[90° - (2x - 20°)] = \sin(x + 10°)$ $110° - 2x = x + 10° + k.360°$ or $110° - 2x = 180° - (x + 10°) + k.360°$ $3x = 100° - k.360°$ or $110° - 2x = 170° - x + k.360°$ $x = 33{,}33° - k.120°$ or $x = -60° - k.360°$; $k \in Z$	✓ equating ✓ co ratio ✓ $80° - x$ ✓$280° + x$ ✓ simplification/*vereenv* ✓ $x = 33{,}33° + k.120°$ ✓ $x = 300° + k.360°$; $k \in Z$ (7) ✓ equating ✓ co ratio ✓ $x + 10°$ ✓$170° - x$ ✓ simplification/*vereenv* ✓ $x = 33{,}33° - k.120°$ ✓ $x = -60° - k.360°$; $k \in Z$ (7)
		[18]

QUESTION/*VRAAG* 6



6.1	Period = 720°	✓ answer (1)
6.2	$y \in [-2\ ;\ 2]$ **OR/*OF*** $-2 \le y \le 2$	✓✓ answer (2) ✓✓ answer (2)
6.3	$f(-120°) - g(-120°)$ $= -3\sin\left(-\dfrac{120°}{2}\right) - 2\cos(-120° - 60°)$ $= \dfrac{4+3\sqrt{3}}{2}$ or 4,60 (4,5980...)	✓ $x = -120°$ ✓ substitution ✓ answer (3)
6.4.1	x-intercepts of g at –90° + 60° = –30° and 90° + 60° = 150° $\therefore x \in (-30°\ ;\ 150°)$ **OR/*OF*** x-intercepts of g at –90° + 60° = –30° and 90° + 60° = 150° $-30° < x < 150°$	✓ value ✓ value ✓ answer (3) ✓ value ✓ value ✓ answer (3)
6.4.2	$x \in [-180°\ ;\ -120°) \cup (-30°\ ; 60°) \cup (150°\ ; 180°]$ **OR/*OF*** $-180° \le x < -120°$ or $-30° < x < 60°$ or $150° < x \le 180°$	✓ $[-180°\ ;\ -120°)$ ✓ $(-30°\ ; 60°)$ ✓ $(150°\ ; 180°]$ ✓ notation for inclusive in the first/last interval (4) ✓ $-180° \le x < -120°$ ✓ $-30° < x < 60°$ ✓ $150° < x \le 180°$ 1 mark: each interval ✓ notation for inclusive in the first/last interval (4)
		[13]

QUESTION/*VRAAG* 7

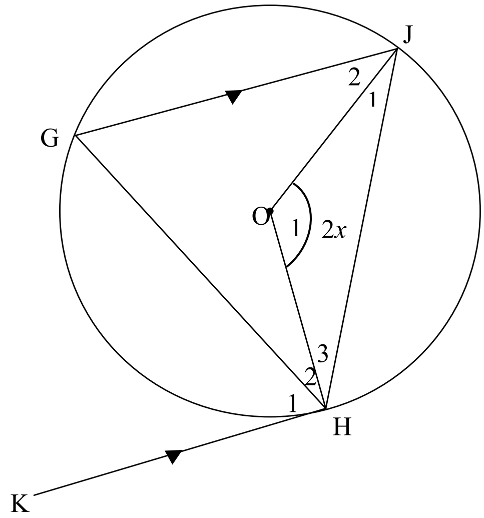


7.1	In PMQ : $\tan\theta = \frac{x}{\text{QM}}$ $\therefore \text{QM} = \frac{x}{\tan\theta}$ **OR/*OF*** $\frac{x}{\sin\theta} = \frac{\text{MQ}}{\sin P}$ $MQ = \frac{x\sin P}{\sin\theta}$ $= \frac{x\cos\theta}{\sin\theta}$ $= \frac{x}{\tan\theta}$	✓ trig ratio ✓ answer (2) ✓ sine rule ✓ answer (2)
7.2	In PMR : $\tan\theta = \frac{x}{\text{MR}}$ *OR* $\text{PMQ} \equiv \text{PMR}$ [AAS/HHS] $\therefore \text{MR} = \frac{x}{\tan\theta} = \text{QM}$ $\text{Q\hat{M}R} = 180° - 2\beta$ $\frac{\sin\beta}{\text{MR}} = \frac{\sin \text{Q\hat{M}R}}{12x}$ $\sin\beta \times \frac{\tan\theta}{x} = \frac{\sin(180° - 2\beta)}{12x}$ $\tan\theta = \frac{\sin 2\beta}{12x} \times \frac{x}{\sin\beta}$ $\tan\theta = \frac{2\sin\beta\cos\beta}{12x} \times \frac{x}{\sin\beta}$ $\tan\theta = \frac{\cos\beta}{6}$ **OR**	✓ MR = QM ✓ correct substitution into the sine rule in ΔQMR ✓ reduction ✓ double angle (4)

	In PMR : $\tan\theta = \frac{x}{MR}$ *OR* $PMQ \equiv PMR$ [AAS/HHS] $MR^2 = QM^2 + QR^2 - 2QM.QR\cos\beta$ $MR^2 = \left(\frac{x}{\tan\theta}\right)^2 + (12x)^2 - 2\left(\frac{x}{\tan\theta}\right)(12x)(\cos\beta)$ $\frac{x^2}{\tan^2\theta} = \frac{x^2}{\tan^2\theta} + 144x^2 - 24\left(\frac{x^2}{\tan\theta}\right)(\cos\beta)$ $24\left(\frac{x^2}{\tan\theta}\right)(\cos\beta) = 144x^2$ $\cos\beta = 6\tan\theta$ $\tan\theta = \frac{\cos\beta}{6}$	✓ correct substitution into the cosine rule in ΔQMR ✓ substitution ✓ MR = QM ✓ simplification (4)
7.3	$\frac{x}{QM} = \frac{\cos\beta}{6}$ [both equal $\tan\theta$] $x = \frac{60\cos 40}{6}$ $x = 7{,}66$ The height of the lighthouse is 8 metres	✓ equating ✓ subst. QM = 60 and $\beta = 40°$ ✓ answer (3)
		[9]

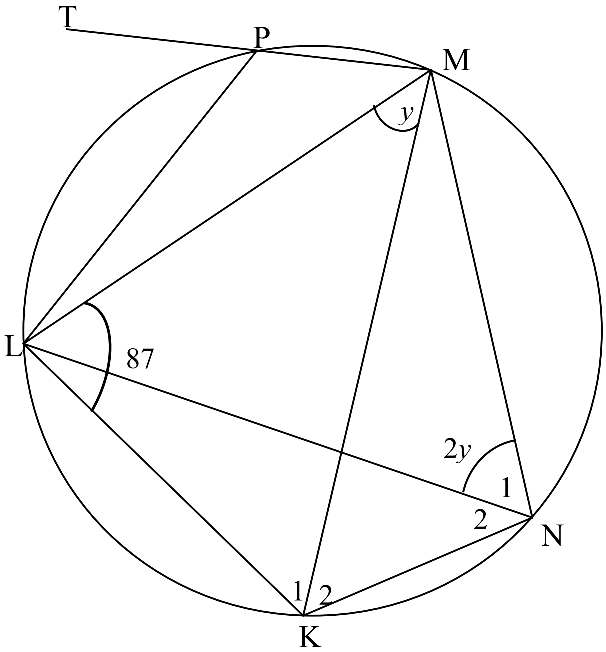
QUESTION/*VRAAG* 8

8.1



8.1.1	$\hat{G} = x$ [$\angle$ centre = $2\times$ circumference / *midpts*$\angle = 2\times$ *omtreks*$\angle$] $\hat{H}_1 = x$ [alt $\angle$s / *verwiss* $\angle$*e*; KH ∥ GJ] $G\hat{J}H = x$ [tan chord theorem / *raaklyn koordstelling*]	✓S ✓R ✓S ✓S ✓R (5)
8.1.2	$\hat{J}_1 + \hat{H}_3 = 180° - 2x$ [sum of $\angle$s in Δ / *som van* $\angle$*e in* Δ] $\therefore \hat{J}_1 = \hat{H}_3 = 90° - x$ [$\angle$s opp equal sides / $\angle$*e teenoor gelyke sye*] $\therefore x + \hat{H}_2 = 90°$ **OR** [tan $\perp$ radius / *raaklyn* $\perp$ *radius*] $\hat{H}_2 = 90° - x$ $\therefore \hat{H}_2 = \hat{H}_3$	 ✓S ✓S ✓R (3)

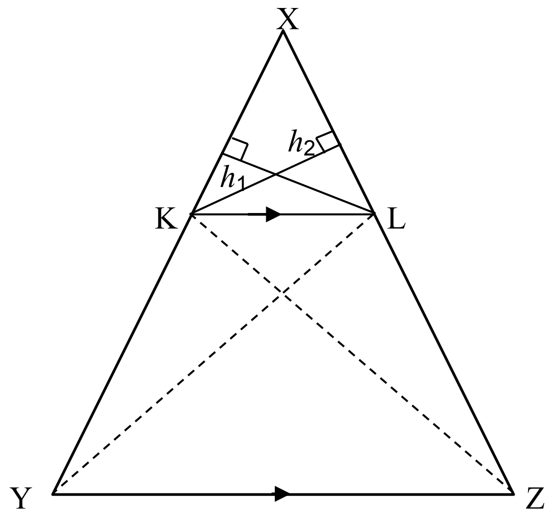
8.2



8.2.1	$\hat{N}_2 = y$ [∠s in the same seg / ∠*e in dieselfde segment*]	✓S ✓R (2)
8.2.2(a)	$2y + y + 87° = 180°$ [opp ∠s of cyclic quad / *teenoorst ∠e v kvh*] $3y = 93°$ $y = 31°$	✓S ✓R ✓S (3)
8.2.2(b)	$T\hat{P}L = 62°$ [ext. ∠ of cyclic quad / *buite ∠ v kvh*]	✓S ✓R (2)
		[15]

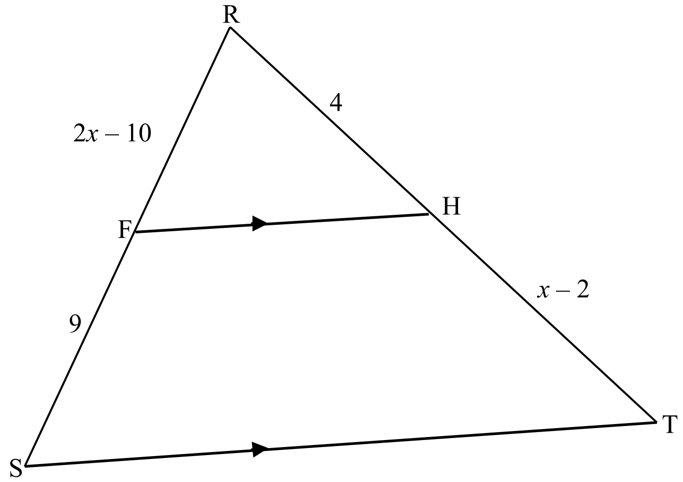
QUESTION/*VRAAG* 9

9.1



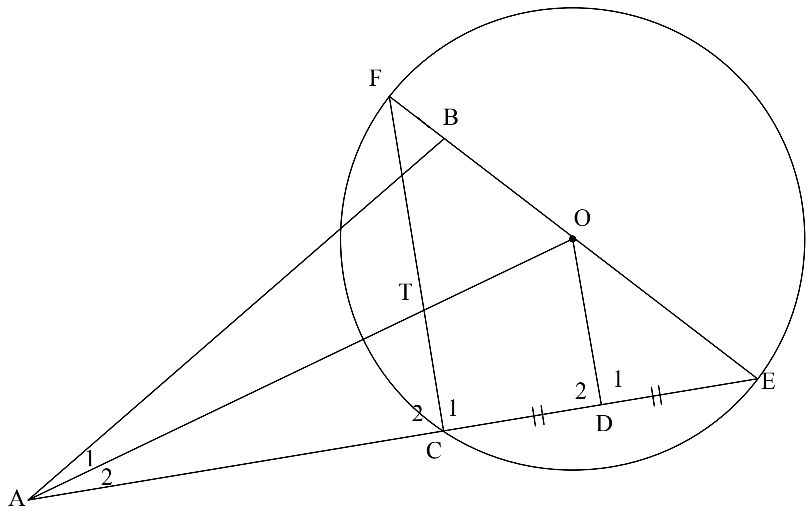
9.1	Constr: Join KZ and LY and draw h_1 from K ⊥ XL and h_2 from L ⊥ XK *Konstr: Verbind KZ en LY en trek* h_1 *vanaf* K ⊥ XL *en* h_2 *vanaf* L ⊥ XK . Proof / *Bewys*: $\frac{\text{area }\Delta XKL}{\text{area }\Delta LYK} = \frac{\frac{1}{2}XK \times h_1}{\frac{1}{2}KY \times h_1} = \frac{XK}{KY}$ $\frac{\text{area }\Delta XKL}{\text{area }\Delta KLZ} = \frac{\frac{1}{2}XL \times h_2}{\frac{1}{2}LZ \times h_2} = \frac{XL}{LZ}$ area ΔXKL = area ΔXKL [common / *gemeenskaplik*] But area ΔLYK = area ΔKLZ [same base & height ; LK ‖ YZ / *dies basis & hoogte ;* LK ‖ YZ] $\therefore \frac{\text{area }\Delta XKL}{\text{area }\Delta LYK} = \frac{\text{area }\Delta XKL}{\text{area }\Delta KLZ}$ $\therefore \frac{XK}{KY} = \frac{XL}{LZ}$	✓ constr / *konstr* ✓ $\frac{\text{area }\Delta XKL}{\text{area }\Delta LYK} = \frac{\frac{1}{2}XK \times h_1}{\frac{1}{2}KY \times h_1}$ ✓ S ✓R ✓ S (5)

9.2



9.2.1	$\frac{RF}{FS}=\frac{RH}{HT}$ [line ‖ one side of Δ **OR** prop theorem; FH ‖ ST] [*Lyn ‖ een sy van Δ **OF** eweredigh. st;* FH‖ ST] $\frac{2x-10}{9}=\frac{4}{x-2}$ $(2x-10)(x-2)=4\times 9$ $2x^2-14x-16=0$ $x^2-7x-8=0$ $(x-8)(x+1)=0$ $\therefore x=8\ \ (x\neq -1)$ **OR/OF** $\frac{RF}{RS}=\frac{RH}{RT}$ [line ‖ one side of Δ **OR** prop theorem; FH ‖ ST] [*Lyn ‖ een sy van Δ **OF** eweredigh. st;* FH‖ ST] $\frac{2x-10}{2x-1}=\frac{4}{x+2}$ $(2x-10)(x+2)=4(2x-1)$ $2x^2-14x-16=0$ $x^2-7x-8=0$ $(x-8)(x+1)=0$ $\therefore x=8\ \ (x\neq -1)$	✓S/R ✓ substitution ✓ standard form ✓ factors ✓answer with rejection (5) ✓S/R ✓ substitution ✓ standard form ✓ factors ✓answer with rejection (5)
9.2.2	$\frac{\text{area }\Delta RFH}{\text{area }\Delta RST}=\frac{\frac{1}{2}RF\times RH\sin\hat{R}}{\frac{1}{2}RS\times RT\sin\hat{R}}$ $=\frac{\frac{1}{2}\times 6\times 4\times\sin\hat{R}}{\frac{1}{2}\times 15\times 10\times\sin\hat{R}}$ $=\frac{24}{150}=\frac{4}{25}$	✓ numerator/*teller* ✓ denominator/*noemer* ✓ substitution ✓answer (4)
		[14]

QUESTION/*VRAAG* 10



10.1.1	$\hat{C}_1 = 90°$ [∠ in semi circle / *∠ in halfsirkel*] $\hat{D}_1 = 90°$ [line from centre to midpt of chord / *lyn vanaf midpt na midpt van koord*] $\therefore \hat{C}_1 = \hat{D}_1$ $\therefore$ FC ∥ OD [corresp ∠s = / *ooreenkomstige ∠e* =] **OR/OF** FO = OE [radii] CD = DE [given / *gegee*] $\therefore$ FC ∥ OD [midpoint theorem / *middelpuntstelling]*	✓ S ✓ R ✓ S ✓ R ✓ R (5) ✓ S ✓ R ✓ S ✓✓ R (5)
10.1.2	$D\hat{O}E = \hat{F}$ [corresp ∠s =; FC ∥ OD] $B\hat{A}E = \hat{F}$ [∠s in the same seg] $\therefore D\hat{O}E = B\hat{A}E$	✓ S ✓ R ✓ S ✓ R (4)
10.1.3	In ΔABE and ΔFCE: $\hat{E}$ is common $B\hat{A}E = \hat{F}$ [proved in 10.1.2] $\therefore A\hat{B}E = \hat{C}_1$ [sum of ∠s in Δ] $\therefore$ ΔABE ∣∣∣ ΔFCE [∠∠∠] $\frac{AB}{FC} = \frac{AE}{FE}$ [∣∣∣ Δs] $AB \times FE = AE \times FC$ But FE = 2 OF [$d = 2r$] And FC =2 OD [midpoint theorem] $AB \times 2OF = AE \times 2OD$ $\therefore AB \times OF = AE \times OD$	✓ S ✓ S ✓ R ✓ S ✓ S ✓ S/R ✓ S (7)

	OR/*OF* In ΔODE and ΔABE 1. $\hat{E}$ is common 2. $D\hat{O}E = E\hat{A}B$ (proved in 10.1.2) 3. $\hat{D}_1 = A\hat{B}E$ ($\angle$ sum Δ) ΔODE ||| ΔABE ($\angle\angle\angle$) $\frac{EO}{EA} = \frac{OD}{AB} = \frac{ED}{EB}$ (||| Δs) $\therefore$ AB.EO = OD.EA but OE = FO (radii) $\therefore$ AB×OF = OD×EA	✓ S ✓ S ✓ R ✓ S ✓ S ✓ S ✓ R (7)
10.2	$\frac{AT}{TO} = \frac{AC}{CD} = \frac{3}{1}$ [line || one side of Δ **OR** prop theorem; FC || OD] But CD = DE $\frac{AE}{CE} = \frac{5}{2}$ $\therefore$ $AE = \frac{5}{2}CE$ $\frac{BE}{CE} = \frac{AE}{FE}$ [||| Δs] $\frac{BE}{CE} = \frac{\frac{5}{2}CE}{FE}$ $BE \times FE = \frac{5}{2}CE^2$ $\therefore 5CE^2 = 2BE.FE$	✓ S ✓ R ✓ S ✓ S ✓substitute $AE = \frac{5}{2}CE$ (5)
		[21]

TOTAL/TOTAAL: 150

MATHEMATICS P2: JUNE 2018
MARKING GUIDELINES NOTES

QUESTION 1

1.1.1	If left as 190, 25 then penalise 1 mark.
1.1.2	If the position is used: $\left[\frac{1}{4}(n+1)+\frac{3}{4}(n+1)\right]\div 2$ $=\frac{158+219}{2}$ $=\frac{377}{2}$ $=188,5$

QUESTION 2

2.4	Do not accept estimation from the table.

QUESTION 3

3.1	No ca if $\frac{x_2-x_1}{y_2-y_1}$	
3.3	MD^2+AM^2 $=\left[(3-8)^2+(-1+11)^2\right]+\left[(3-7)^2+(-1-1)^2\right]$ $=125+20$ $=145$ AD^2 $=(7-8)^2+(1+11)^2$ $=145$ $MD^2+AM^2=AD^2$	✓ AM^2+MD^2 ✓ AD^2 ✓ $MD^2+AM^2=AD^2$ (3)

QUESTION 4

4.3	Candidates can use the rotation of P through $90°$ to get to R(6 ; 4) If the candidate assumes that R(4 ; 6) : 1/4 marks

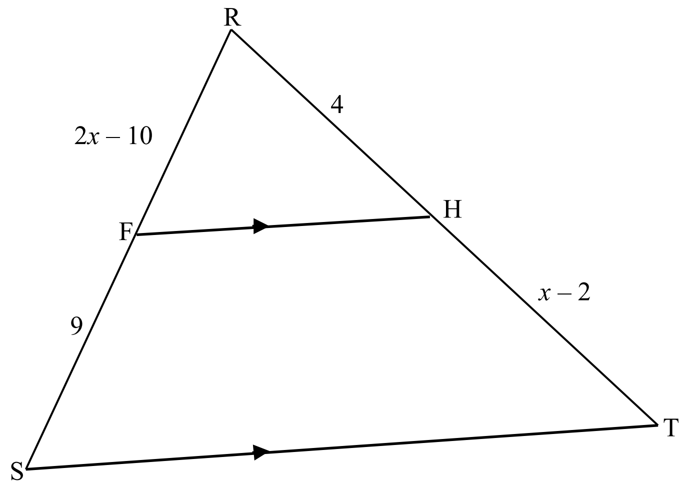
QUESTION 6

6.2	$y\in(-2\ ;\ 2)$	1/2 marks
	$-2<y<2$	1/2 marks

QUESTION 7

7.3	There is NO penalty for incorrect rounding.

QUESTION 9



9.2.2	Join FT. area ΔRFH = $\frac{4}{10}\times$ (area ΔRFT) But area ΔRFT = $\frac{6}{15}\times$ (area ΔRST) (common vertex; = heights) area ΔRFH = $\frac{4}{10}\times\frac{6}{15}\times$(area ΔRST) $\frac{\text{area}\Delta\text{RFH}}{\text{area}\Delta\text{RST}}=\frac{4}{25}$