basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

MATHEMATICS P2

NOVEMBER 2019

MARKS: 100

TIME: 2 hours

This question paper consists of 10 pages and a 15-page answer book.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of EIGHT questions.
2. Answer ALL the questions in the SPECIAL ANSWER BOOK provided.
3. Clearly show ALL calculations, diagrams, graphs, etc. that you used to determine the answers.
4. Answers only will NOT necessarily be awarded full marks.
5. If necessary, round off answers to TWO decimal places, unless stated otherwise.
6. Diagrams are NOT necessarily drawn to scale.
7. You must use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
8. Write neatly and legibly.

QUESTION 1

1.1 An ice cream vendor recorded his daily sales for a period of time. The number of ice creams that he sold each day is given in the table below.

5	7	8	10	13	15	15	15	21	24
29	30	32	36	38	44	45	51	55	

1.1.1 Write down the mode of the data set. (1)

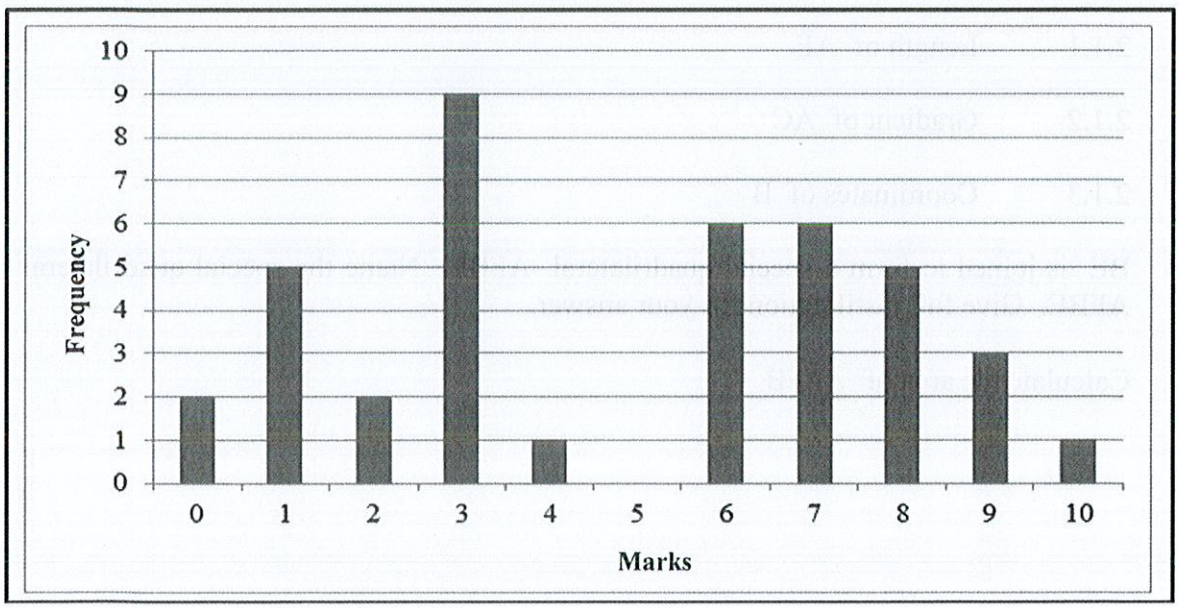
1.1.2 Determine the median of the data set. (1)

1.1.3 Calculate the interquartile range. (3)

1.1.4 On the scaled line provided in the ANSWER BOOK, draw a box and whisker diagram for the data set. (2)

1.2 Learners in a certain class wrote a Mathematics test that had a maximum mark of 10. The teacher represented the marks obtained by the learners of this class in the bar graph below.

Bar graph showing distribution of marks scored in Mathematics test



1.2.1 How many learners scored 8 marks out of 10 for the test? (1)

1.2.2 How many learners are in this class? (1)

1.2.3 Calculate the range of the marks scored in the test. (2)

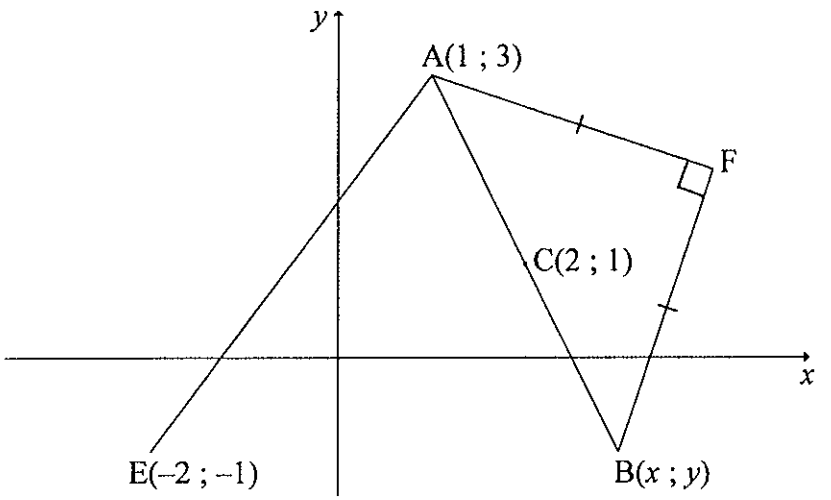
1.2.4 If the pass mark for the test was 50%, what percentage of the learners failed the test? (2)

1.2.5 Calculate the mean mark scored in the test. (3)

[16]

QUESTION 2

In the diagram below, A(1 ; 3), B(x ; y) and E(–2 ; –1) are points on a Cartesian plane. C(2 ; 1) is the midpoint of AB. Also, F is a point such that AF = FB and AF ⊥ FB.



2.1 Determine the:

2.1.1 Length of AE (2)

2.1.2 Gradient of AC (2)

2.1.3 Coordinates of B (3)

2.2 BE is joined to form a special quadrilateral AFBE. Name the special quadrilateral AFBE. Give full justification for your answer. (3)

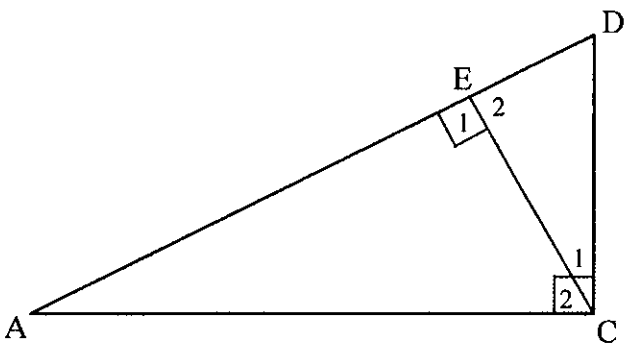
2.3 Calculate the area of ΔAFB. (5)
[15]

QUESTION 3

3.1 If $x = 37°$ and $y = 44°$, calculate the value of $\sin^2 x + 2\cos y$. (1)

3.2 WITHOUT using a calculator, determine the value of $\dfrac{\sin 30°.\cot 45°}{\cos 30°.\tan 60°}$ (3)

3.3 In the diagram below, ΔACD is right-angled at C. E lies on AD such that CE is perpendicular to AD.



3.3.1 Write down the ratio for $\cos D$ in ΔACD. (1)

3.3.2 Write down the ratio for $\cos D$ in ΔCED. (1)

3.3.3 If AD = 13 units and DC = 5 units, calculate the length of ED. (2)

3.4 Given that $\cos\theta = \dfrac{5}{13}$ and $\sin\theta < 0$.

With the aid of a diagram and WITHOUT using a calculator, determine the value of:

3.4.1 $\sin\theta$ (3)

3.4.2 $\sec\theta + \tan^2\theta + 1$ (4)

[15]

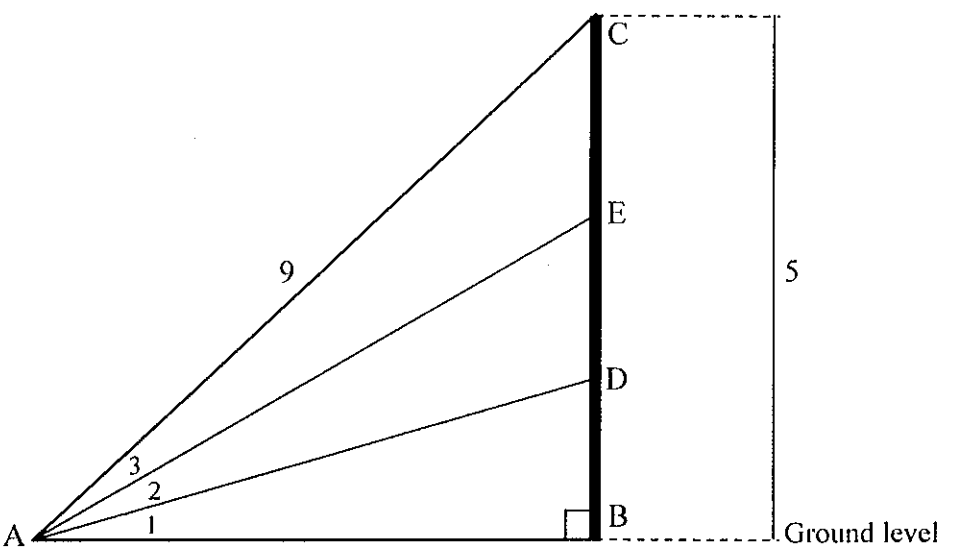
QUESTION 4

4.1 If $0° \leq \theta \leq 90°$, solve for θ in each of the following questions:

4.1.1 $2\sin\theta + 1 = 1{,}28$ (2)

4.1.2 $\tan 2\theta = 4\cot 60^0$ (3)

4.2 In the diagram below, B is the foot of a multi-storey building. Three people, D, E and C, are standing at the windows on three different floors. They are all looking at object A on the ground, which is in the same horizontal plane as B. AC = 9 units, BC = 5 units and $\hat{A}_1 = \hat{A}_2 = \hat{A}_3$.



Calculate the:

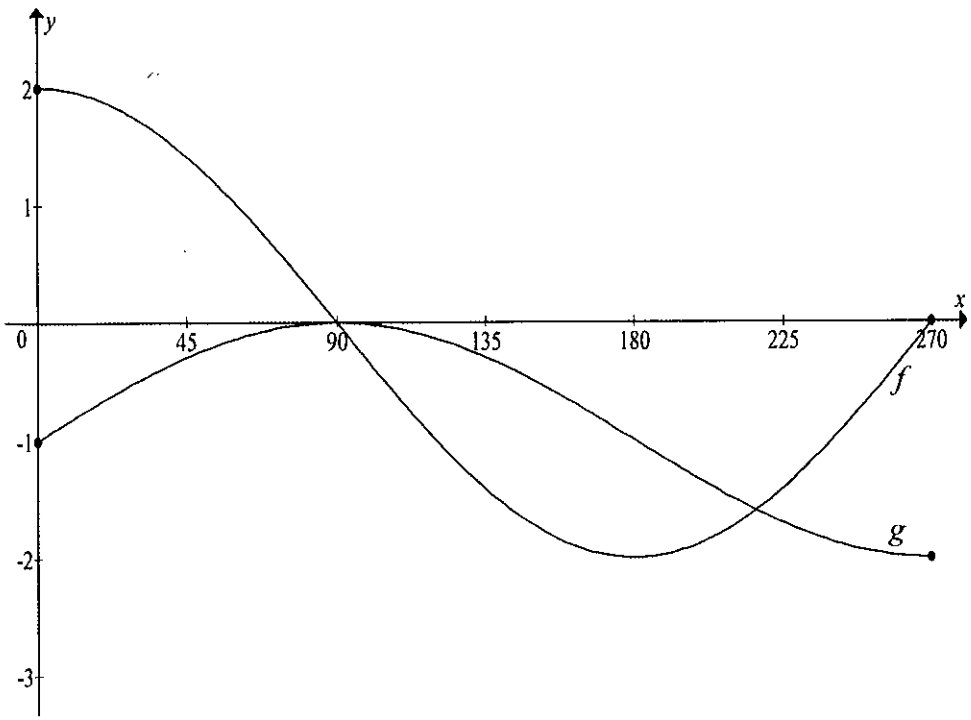
4.2.1 Size of $C\hat{A}B$ (2)

4.2.2 Length of AE (5)

4.2.3 Length of DE (4)
[16]

QUESTION 5

Sketched below are the graphs of $f(x) = 2\cos x$ and $g(x) = \sin x - 1$ for the interval $x \in [0°; 270°]$.



5.1 Write down the:

5.1.1 Period of f (1)

5.1.2 Range of g (2)

5.1.3 Number of solution(s) to $f(x) = g(x)$ in the interval $0° \leq x \leq 270°$ (1)

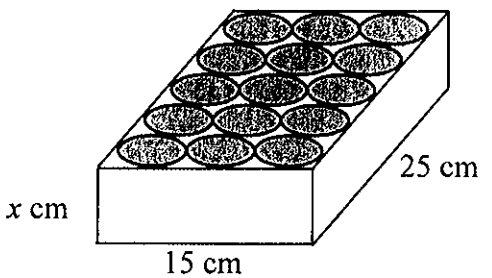
5.2 For which value(s) of x in the interval $0° \leq x \leq 270°$ is $f(x).g(x) \geq 0$? (2)

5.3 The graph h is obtained by reflecting graph g about the x-axis. Write down the coordinates of the minimum turning point of h in the interval $0° \leq x \leq 270°$. (2)

[8]

QUESTION 6

An open rectangular cardboard box has the following dimensions: length = 25 cm, breadth = 15 cm and height = x cm. The volume of the box is 3 000 cm^3. Fifteen (15) identical cans of cold drink fit snugly into the box, as shown in the diagram below. The box and the cans are of equal height. (Ignore the thickness of the cardboard in your calculations.)



6.1 Calculate the height of the box. (3)

6.2 Calculate the radius of a can. (2)

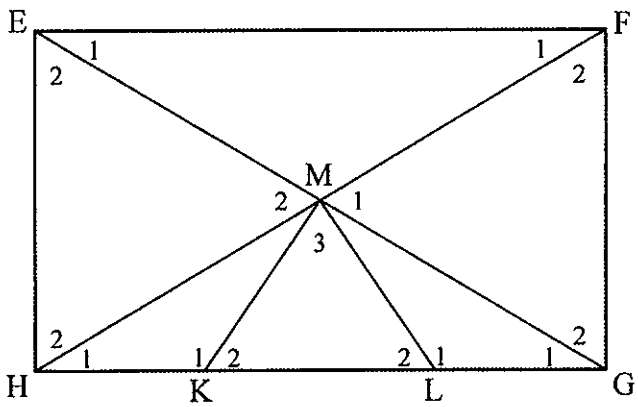
6.3 If a can is filled to the top, calculate the volume of cold drink contained in the can. (2)

6.4 Calculate the volume of the space in between all the cans in the box. (2)
[9]

Give reasons for ALL geometry statements used in QUESTIONS 7 and 8.

QUESTION 7

7.1 In the diagram, EFGH is a rectangle having diagonals intersecting at M. $\hat{M}_2 = 60°$ and $\hat{L}_2 = 40°$.

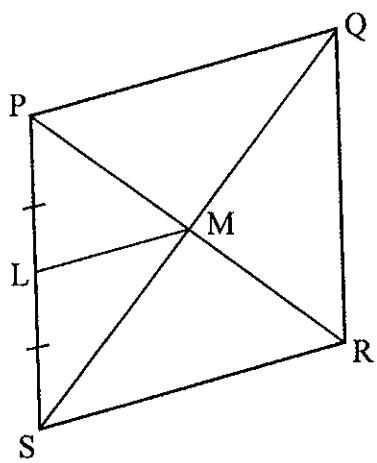


Calculate the size of:

7.1.1 $\hat{F}_1$ (2)

7.1.2 $G\hat{M}L$ (3)

7.2 PQRS is a rhombus with diagonals PR and SQ intersecting at M. The perimeter of the rhombus is 12 cm. L is the midpoint of PS.



Calculate the length of LM. (4)

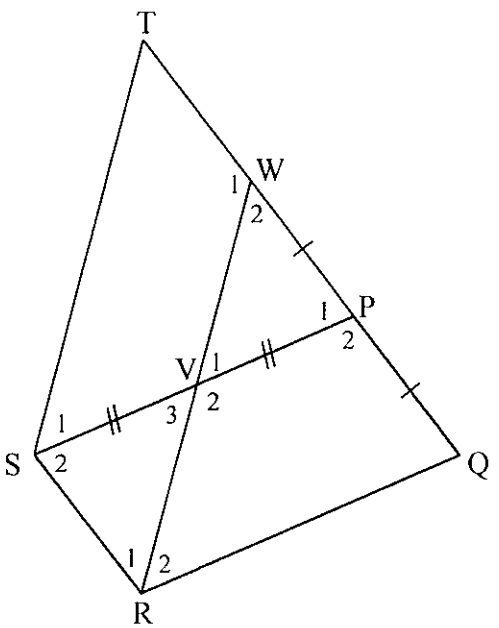
[9]

QUESTION 8

8.1 Complete the statement so that it is TRUE:

The diagonals of a parallelogram … each other. (1)

8.2 In the diagram below, P is the midpoint of side WQ of ΔWQR. V is on WR such that VP||RQ. PV is produced by its own length to S. PW is produced to T and ST drawn.



8.2.1 Give a reason why WV = VR. (1)

8.2.2 Prove that:

(a) ΔVWP ≡ ΔVRS (3)

(b) SWPR is a parallelogram (2)

(c) PQRS is a parallelogram (3)

8.2.3 If it is further given that RSTW is a parallelogram, show that TQ = 3SR. (2)
[12]

TOTAL: 100

NAME OF LEARNER: *NAAM VAN LEERDER:*	
CLASS: *KLAS:*	

NATIONAL SENIOR CERTIFICATE
NASIONALE SENIOR SERTIFIKAAT

MATHEMATICS P2/*WISKUNDE V2*

GRADE/*GRAAD* 10

NOVEMBER 2019

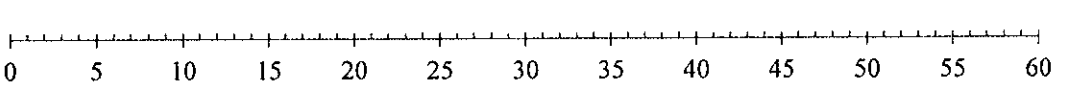
SPECIAL ANSWER BOOK
SPESIALE ANTWOORDEBOEK

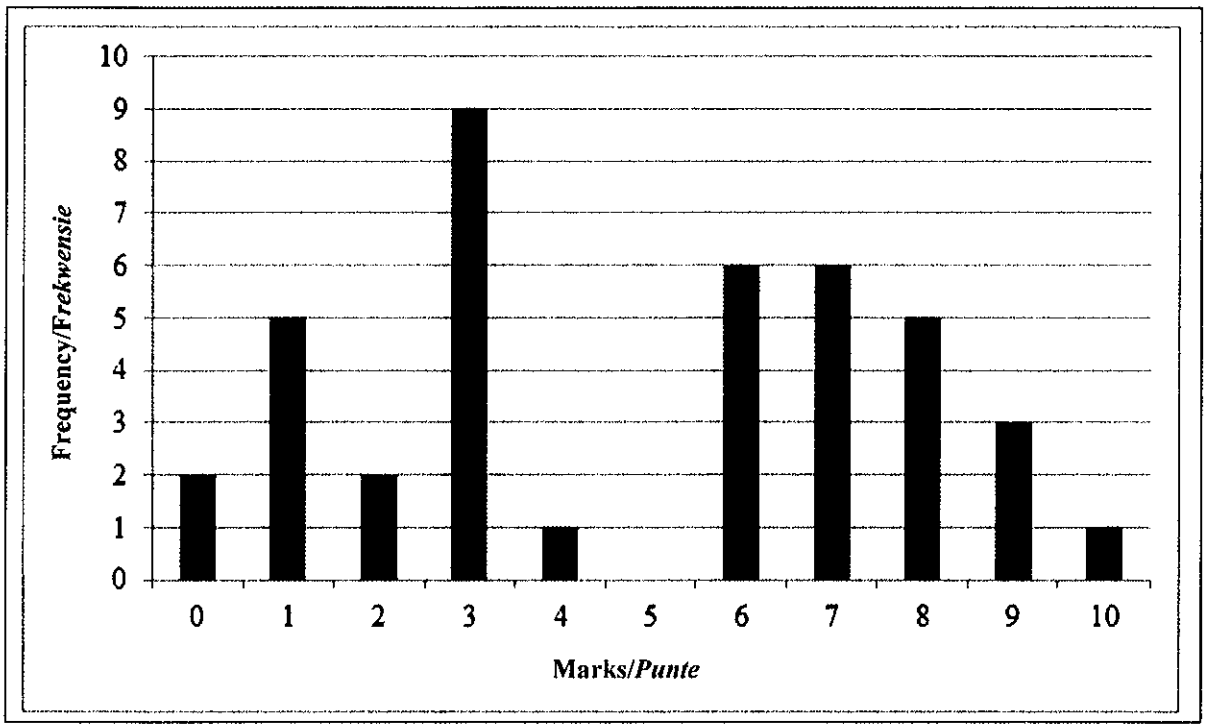
QUESTION *VRAAG*	MARK *PUNT*			INITIAL *PARAAF*	MODERATION *MODERERING*			INITIAL *PARAAF*
1								
2								
3								
4								
5								
6								
7								
8								
TOTAL *TOTAAL* (100)								

This answer book consists of 15 pages.
Hierdie antwoordeboek bestaan uit 15 bladsye.

KWAZULU-NATAL

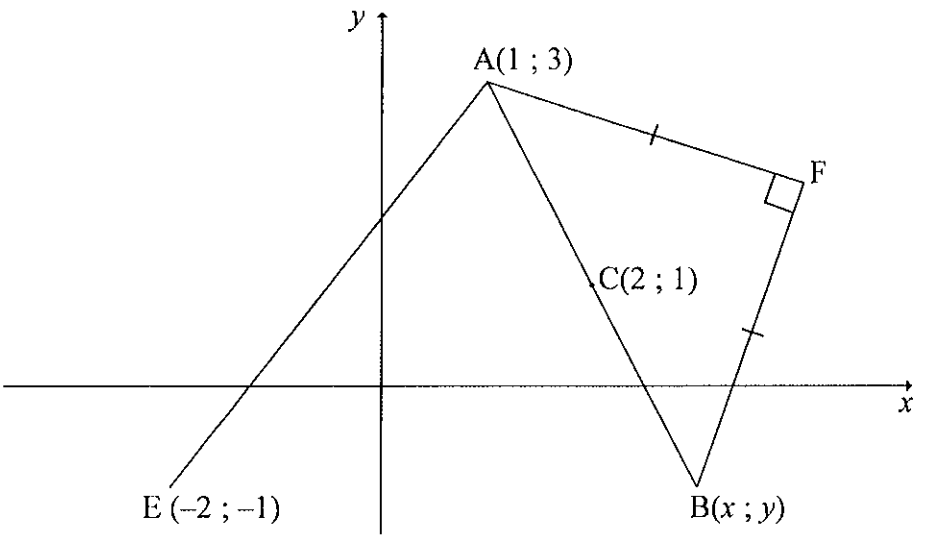
QUESTION/*VRAAG* 1

	Solution/*Oplossing*	**Marks** ***Punte***
	5 7 8 10 13 15 15 15 21 24 29 30 32 36 38 44 45 51 55	
1.1.1		(1)
1.1.2		(1)
1.1.3		(3)
1.1.4		(2)



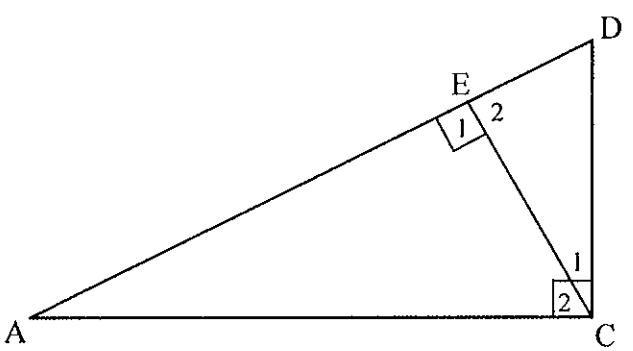
1.2.1		(1)
1.2.2		(1)
1.2.3		(2)
1.2.4		(2)
1.2.5		(3)
		[16]

QUESTION/*VRAAG* 2

	Solution/*Oplossing*	**Marks** ***Punte***
		
2.1.1		(2)
2.1.2		(2)
2.1.3		(3)

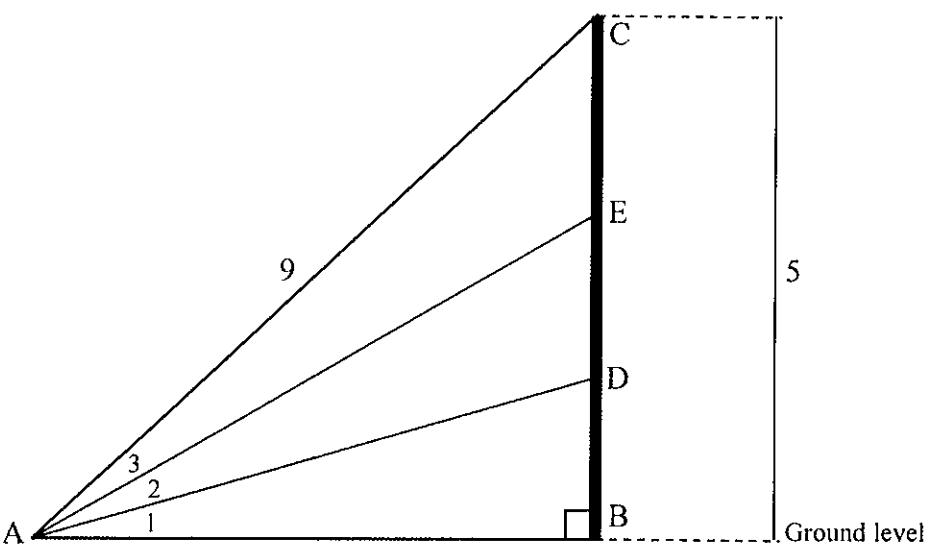
2.2		(3)
2.3		(5)
		[15]

QUESTION/*VRAAG* 3

	Solution/*Oplossing*	**Marks** ***Punte***
3.1		(1)
3.2		(3)
3.3		
3.3.1		(1)
3.3.2		(1)
3.3.3		(2)

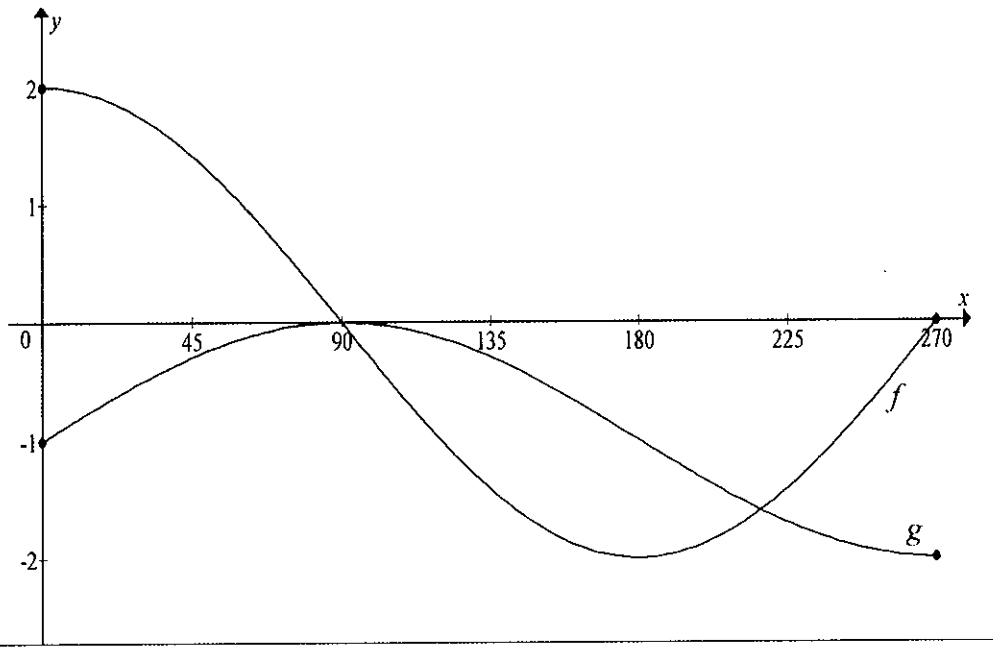
3.4.1		(3)
3.4.2		(4)
		[15]

QUESTION/*VRAAG* 4

	Solution/*Oplossing*	**Marks** ***Punte***
4.1.1		(2)
4.1.2		(3)
4.2		
4.2.1		(2)

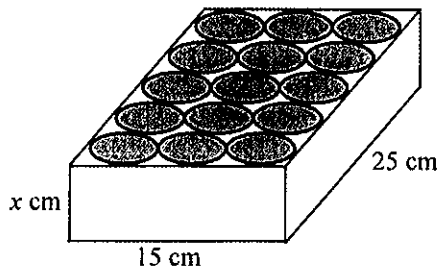
4.2.2		(5)
4.2.3		(4)
		[16]

QUESTION/*VRAAG* 5

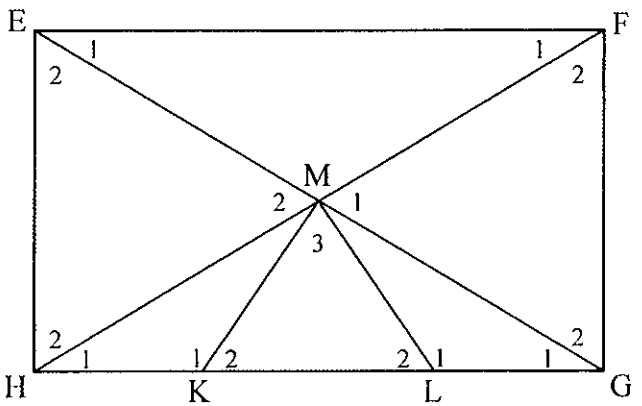


5.1.1		(1)
5.1.2		(2)
5.1.3		(1)
5.2		(2)
5.3		(2)
		[8]

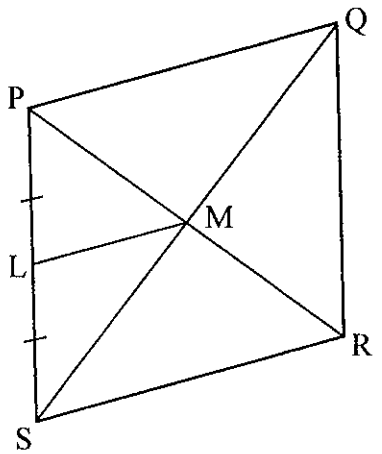
QUESTION/*VRAAG* 6

	Solution/*Oplossing*	**Marks** ***Punte***
		
6.1		(3)
6.2		(2)
6.3		(2)
6.4		(2)
		[9]

QUESTION/*VRAAG* 7

	Solution/*Oplossing*	**Marks** ***Punte***
		
7.1.1		(2)
7.1.2		(3)

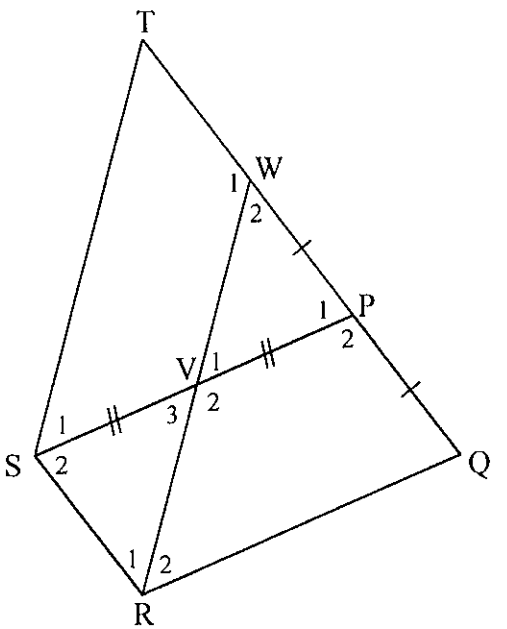
7.2



(4)

[9]

QUESTION/*VRAAG* 8

	Solution/*Oplossing*	**Marks** ***Punte***
8.1		(1)
		
8.2.1		(1)
8.2.2 (a)		(3)
8.2.2 (b)		(2)
8.2.2 (c)		(3)

8.2.3		(2)
		[12]

TOTAL/*TOTAAL*: 100

ADDITIONAL SPACE/*BYKOMENDE RUIMTE*

basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE/ *NASIONALE SENIOR SERTIFIKAAT*

GRADE/*GRAAD* 10

MATHEMATICS P2/*WISKUNDE V2*

NOVEMBER 2019

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS/*PUNTE*: 100

These marking guidelines consist of 16 pages.
Hierdie nasienriglyne bestaan uit 16 bladsye.

15/11/2019

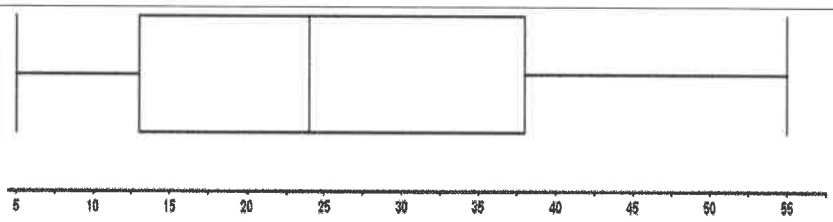
NOTE:

- If a candidate answer 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 memorandum.
- Assuming values/answers in order to solve a problem is unacceptable.

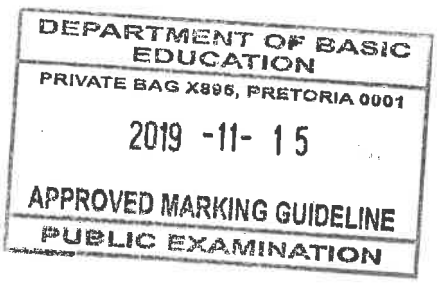
LET WEL:

- *As 'n kandidaat 'n vraag TWEE keer beantwoord het, sien slegs die EERSTE poging na.*
- *As 'n kandidaat 'n antwoord deurgehaal en nie oorgedoen het nie, sien die deurgehaalde antwoord na.*
- *Volgehoue akkuraatheid is op ALLE aspekte van die memorandum van toepassing.*
- *Dit is onaanvaarbaar om waardes/antwoorde te veronderstel om 'n probleem op te los.*

QUESTION/*VRAAG* 1

1.1.1	15 is the mode/*is die modus*	✓answer/*antwoord* (1)
1.1.2	Position of the median: $\frac{n+1}{2}$ = 10th position median = 24 Answer only: full marks *Posisie van die mediaan* $= \frac{n+1}{2}$ $= 10de\ posisie$ *mediaan* = 24	✓answer/*antwoord* (1)
1.1.3	Interquartile range $= Q_3 - Q_1$ $= 38 - 13$ $= 25$ Answer only: full marks *Variasiewydte* $= Q_3 - Q_1$ $= 38 - 13$ $= 25$	✓Q_3 ✓Q_1 ✓answer/*antwoord* (3)
1.1.4		✓box/*mond* CA from 1.1.2 and 1.1.3 ✓whiskers/*snor* (accuracy) (2)

1.2.1	5 learners/*leerders*	✓answer/*antwoord* (1)
1.2.2	40 learners/*leerders*	✓answer/*antwoord* (1)
1.2.3	Range = max value - min value $= 10 - 0$ $= 10$ Answer only: full marks *Varisasiewydte = maks waarde – min waarde* $= 10 - 0$ $= 10$	✓min and max/*min en maks* ✓answer/*antwoord* (2)
1.2.4	Number of learners/*Getal leerders* $= 1 + 9 + 2 + 5 + 2$ $= 19$ Percentage / *Persentasie* $= \frac{19}{40} \times 100$ $= 47,5\%$ Answer only: full marks	✓no. of learners/*getal leerders* ✓answer/*antwoord* (2)
1.2.5	$\bar{x} = \frac{(0 \times 2) + (1 \times 5) + (2 \times 2) + (3 \times 9) + \ldots + (10 \times 1)}{40}$ $\bar{x} = \frac{195}{40}$ $\bar{x} = \frac{39}{8}$ $\bar{x} = 4,88$	✓195 ✓40 ✓answer/*antwoord* (3)
		[16]



QUESTION/*VRAAG* 2

2.1.1	$AE = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(1+2)^2 + (3+1)^2}$ $= 5$ units Answer only: max. 1/2	✓substitution/ *vervanging* ✓answer/*antwoord* (2)
2.1.2	$m_{AC} = \frac{y_2 - y_1}{x_2 - x_1}$ $= \frac{3-1}{1-2}$ $= -2$ Answer only: max. 1/2	✓substitution/ *vervanging* ✓answer/*antwoord* (2)
2.1.3	$x_C = \frac{x_A + x_B}{2}$ $\quad y_C = \frac{y_A + y_B}{2}$ $2 = \frac{1+x}{2}$ $\quad 1 = \frac{3+y}{2}$ $x = 3$ $\quad y = -1$ B(3;−1) **OR/OF** Answer only: max. 3/3 $(x_A; y_A) \rightarrow (x_C; y_C)$ $[(x+1);(y-2)]$ $\therefore (x_C; y_C) \rightarrow (x_B; y_B)$ by symmetry $\therefore$ B(3;−1)	✓ substitution/ *vervanging* ✓*x*-value/-*waarde* ✓*y*-value/-*waarde* (3) ✓ symmetry/ *simmetrie* ✓*x*-value/-*waarde* ✓*y*-value/-*waarde*

2.2	$BE = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(3+2)^2 + (-1+1)^2}$ $= 5$units ***OR/OF*** BE=3+2 (horizontal line/horisontale lyn) =5units BE = AE and/en AF = BF ∴ AFBE is a kite/is 'n vlieër (2 adj. sides = but opp. sides not equal/ *2 aangr.sye = maar teenoorg.sye is nie gelyk nie*) ***OR/OF*** $m_{EF} = \frac{1}{2}$ → AB is perpendicular to EF and C is the midpoint ∴ $AFBE$ is a kite (Longer diag. bisects the shorter diag. at 90°)	✓BE ✓kite/*vlieër* ✓justification/ *regverdiging* (3) ✓$m_{EF} = \frac{1}{2}$ ✓kite/*vlieër* ✓justification/ *regverdiging* (3)
2.3	$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(3-1)^2 + (-1-3)^2}$ $= 2\sqrt{5}$ units ∴ AC = $\sqrt{5}$ units In ΔACF $\hat{A} = 45°$ $\tan 45° = \frac{CF}{\sqrt{5}}$ $CF = \sqrt{5}$ units $\text{Area} = \frac{1}{2} \times AB \times CF$ $= \frac{1}{2} \times 2\sqrt{5} \times \sqrt{5}$ $= 5$ units^2	✓AB ✓ratio/*verhouding* ✓CF ✓substitution/ *vervanging* ✓answer/*antwoord* (5)

OR / OF

$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
$$= \sqrt{(3-1)^2 + (-1-3)^2}$$
$$= 2\sqrt{5} \text{ units}$$

In ΔAFB: $F\hat{A}B = F\hat{B}A = 45°$ $(\angle sopp = sides)$

✓AB
✓ $F\hat{A}B = F\hat{B}A = 45°$

$$sin45° = \frac{AF}{AB} = \frac{AF}{2\sqrt{5}}$$
$$AF = \sqrt{10}$$
$$AF = BF = \sqrt{10}$$

✓ratio

$$\text{Area of } \Delta AFB = \frac{1}{2}\sqrt{10}.\sqrt{10}$$
$$= 5 \text{units}^2$$

✓substitution/ *vervanging*
✓answer/*antwoord* (5)

OR / OF

$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
$$= \sqrt{(3-1)^2 + (-1-3)^2}$$
$$= 2\sqrt{5} \text{ cm}$$

✓AB

In ΔAFB: $AF = BF$ *(given)*

$$AB^2 = BF^2 + BF^2$$
$$BF = \sqrt{\frac{20}{2}}$$
$$BF = \sqrt{10}$$

✓Pythagoras theorem /*stelling van Pythagoras*

✓BF

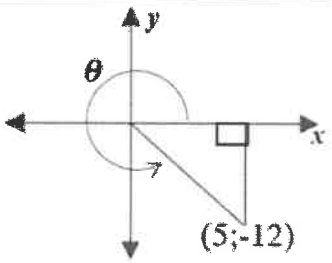
$$\text{Area of } \Delta AFB = \frac{1}{2}\sqrt{10}.\sqrt{10}$$
$$= 5 \text{ units}^2$$

✓substitution/ *vervanging*
✓answer/*antwoord* (5)

[15]

QUESTION/*VRAAG* 3

3.1	$\sin^2 x + 2\cos y$ $= \sin^2 37° + 2\cos 44°$ $= 1{,}80$ Answer only: full marks	✓answer/*antwoord* (1)
3.2	$\frac{\sin 30°.\cot 45°}{\cos 30°.\tan 60°}$ $= \frac{\frac{1}{2}.1}{\frac{\sqrt{3}}{2}.\sqrt{3}}$ $= \frac{1}{3}$ Answer only: max. 1/3	✓ $\frac{1}{2}$ and/*en* 1 ✓ $\frac{\sqrt{3}}{2}$ and/*en* $\sqrt{3}$ ✓answer/*antwoord* (3)
3.3.1	In Δ ACD, $\cos D = \frac{CD}{AD}$	✓answer/*antwoord* (1)
3.3.2	In Δ CDE , $\cos D = \frac{DE}{CD}$	✓answer/*antwoord* (1)
3.3.3	$\frac{CD}{AD} = \frac{DE}{CD}$ both/*beide* $= \cos D$ $ED = \frac{CD^2}{AD}$ $ED = \frac{25}{13}$ $ED = 1{,}92$ units/*eenhede* **OR/OF** $\cos D = \frac{CD}{AD}$ $= \frac{5}{13}$ $\hat{D} = 67{,}38°$ $\cos 67{,}38° = \frac{ED}{5}$ $ED = 1{,}92$ units/*eenhede*	✓equating/*gelykstelling* ✓answer/*antwoord* (2) ✓ $\hat{D} = 67{,}38°$ ✓ answer/*antwoord* (2)

3.4.1	 $\cos\theta = \frac{5}{13}$ $y^2 = r^2 - x^2$ $= (13)^2 - (5)^2$ $= 144$ $y = -12$ (in the 4th quad/*in 4de kwad*) $\therefore \sin\theta = -\frac{12}{13}$	✓diagram in correct quadrant ✓*y*-value/*-waarde* ✓answer/*antwoord* (3)
3.4.2	$\sec\theta + \tan^2\theta + 1$ $= \frac{13}{5} + \left(\frac{-12}{5}\right)^2 + 1$ $= \frac{13}{5} + \frac{144}{25} + 1$ $= \frac{234}{25}$	✓$\frac{13}{5}$ ✓$\frac{-12}{5}$ ✓ 234 ✓ 25 (4)
		[15]

QUESTION/*VRAAG* 4

4.1.1	$2\sin\theta + 1 = 1{,}28$ $2\sin\theta = 0{,}28$ $\sin\theta = 0{,}14$ $\theta = 8{,}05°$ Penalty for incorrect rounding in this question **only**.	✓simplification/*vereenvoudiging* ✓answer/*antwoord* (2)
4.1.2	$\tan 2\theta = 4\cot 60°$ $\tan 2\theta = \frac{4}{\sqrt{3}}$ $2\theta = 66{,}5867\ldots\ldots°$ $\theta = 33{,}29°$	✓$\frac{4}{\sqrt{3}}$ ✓ $66{,}5867\ldots\ldots°$ ✓answer/*antwoord* (3)
4.2.1	In ΔABC $\sin A = \frac{BC}{AC} = \frac{5}{9}$ $C\hat{A}B = 33{,}75°$ **OR/OF** $AB = 2\sqrt{14}$ (Pythagoras theorem)/*stelling van Pythagoras* $\cos A = \frac{2\sqrt{14}}{9}$ $A = 33{,}75^0$ **OR/OF** $\tan A = \frac{5}{2\sqrt{14}}$ $A = 33{,}75^0$	✓ratio/*verhouding* ✓answer/*antwoord* (2) ✓ratio/*verhouding* ✓answer/*antwoord* (2) ✓ratio/*verhouding* ✓answer/*antwoord* (2)

4.2.2	Finding AB: $\sqrt{9^2-5^2} = 7,48$ units/*eenhede* OR / *OF* In ΔABC: $\cos\hat{A} = \frac{AB}{9}$ $AB = \cos 33,75° \times 9$ $AB = 7,48$ units/*eenhede* OR / *OF* $BC = 5$units $AB = \frac{5}{\tan 33,75°}$ $= 7,48$ units/*eenhede* $\therefore$ In ΔAEB: $\hat{A}_1 + \hat{A}_2 + \hat{A}_3 = 33,75°$ $\therefore \hat{A}_1 + \hat{A}_2 = B\hat{A}E = 22,50°$ $\cos\hat{A} = \frac{AB}{AE}$ $\cos 22,5° = \frac{7,48}{AE}$ $AE = 8,096...$ $AE = 8,10$	✓AB ✓AB ✓ $B\hat{A}E = 22,50°$ ✓ratio/*verhouding* ✓substitution/ *vervanging* ✓AE (5)

4.2.3	In ΔABE $BE = \sqrt{AE^2 - AB^2}$ $= \sqrt{(8,1)^2 - (7,48)^2}$ $= 3,11$ OR/*OF* $BE = \sin 22,5° \times 8,10 = 3,10$ OR/*OF* $BE = \tan 22,5° \times 7,48 = 3,10$	✓BE
	In ΔABD $\tan 11,25° = \frac{DB}{AB}$ $\therefore DB = \tan 11,25 \times 7,48$ $DB = 1,49$	✓DB
	$DE = BE - DB$ $= 3,10 - 1,49$ *or* $3,11 - 1,49$ $= 1,61$ units/*eenhede* $= 1,62$ units/*eenhede*	✓ BE – DB ✓answer/*antwoord* (4)
		[16]

QUESTION/*VRAAG* 5

5.1.1	Period of/*Periode van* f: 360°	✓answer/*antwoord* (1)
5.1.2	Range of/*Waardeversameling van* g: $-2 \le y \le 0$ or/*of* $y \in [-2\,;0]$	✓critical values/ *kritieke waardes* ✓notation/*antwoord* (2)
5.1.3	2 solutions/*oplossings*	✓answer/antwoord(1)
5.2	$90^\circ \le x \le 270^\circ$ or/*of* $x \in [90^\circ\,;270^\circ]$	✓critical values/ *kritieke waardes* ✓ notation (2)
5.3	$h(x) = -\sin x + 1$ Minimum T.P/*Draaipunt* = $(90^\circ\,;0)$	✓✓ $(90^\circ;0)$ (2) (accuracy marks)
		[8]

QUESTION/*VRAAG* 6

6.1	Volume of the box/*van houer* = L × B × H $3000 = 25 \times 15 \times x$ $x = \frac{3000}{375}$ $x = 8$ cm The height of the box/*hoogte van houer* = 8 cm	✓formula/*formule* ✓substitution/ *vervanging* ✓answer/*antwoord* (3)
6.2	The diameter of each can is 5 cm./ *Die diameter van elke blikkie is 5* cm. The radius of each can is 2,5 cm./ *Die radius van elke blikkie is 2,5* cm. Answer only: full marks	✓diameter ✓answer/*antwoord* (2)
6.3	Volume of drink in a can/*van koeldrank in blikkie* = $\pi r^2 h$ $= \pi(2{,}5)^2(8)$ $= \pi(2{,}5)^2(8)$ $= 157{,}08$ cm^3	✓substitution into correct formula/ *vervanging* ✓answer/*antwoord* (2)
6.4	Volume of the remaining space = V of the box – V of the 15 cans/ *Volume van oorblywende spasie = V van die houer – V van die 15 blikkies* $= 3000 - (15 \times 157{,}08)$ $= 3000 - 2356{,}20$ $= 643{,}80$cm^3	✓$15 \times 157{,}08$ ✓answer/*antwoord* (2)
		[9]

QUESTION/*VRAAG* 7		
7.1.1	$E\hat{M}F = 120°$ (∠'s on straight line/*op reguitlyn*) $\hat{F}_1 = \hat{E}_1 = 30°$ (∠'s opp. = sides OR diag.of a rectangle = and bisect each other). ***OR/OF*** $\hat{F}_1 = \hat{E}_1$ (angles opp. = sides OR diag. of a rectangle = and bisect each other). $\hat{M}_2 = \hat{E}_1 + \hat{F}_1$ (ext. angle of Δ) $60^\circ = \hat{E}_1 + \hat{F}_1$ $\therefore \hat{F}_1 = 30^\circ$	✓S/R ✓S/R (2) ✓S/R ✓answer/*antwoord* (2)
7.1.2	$\hat{E}_1 = \hat{G}_1 = 30°$ (Alt.∠'s: EF ‖ HG) $\hat{L}_2 = \hat{G}_1 + G\hat{M}L$ (ext.∠ = sum of two opp.int.∠'s) $40° = 30° + G\hat{M}L$ $G\hat{M}L = 10°$ ***OR/OF*** $\hat{M}_1 = 60^\circ$ (vert. opp. angles) $\therefore \hat{G}_2 = \hat{F}_2 = 60^\circ$ (angles opp. = sides) But $\hat{G}_2 + \hat{G}_1 = 90^\circ$ (angles of rectangle) $\hat{G}_1 = 30^\circ$ $\hat{L}_2 = \hat{G}_1 + G\hat{M}L$ (ext. angle of Δ) $40^\circ = 30^\circ + G\hat{M}L$ $G\hat{M}L = 10^\circ$ ***OR/OF*** $\hat{G}_1 = \hat{E}_1 = 30^\circ$ (alt. angle EF‖HG) $\hat{L}_2 = 40^\circ$ (given) $\hat{L}_1 = 180 - 40^\circ = 140^\circ$ (angles in str. line) $G\hat{M}L = 180^\circ - 140^\circ - 30$ $G\hat{M}L = 10^\circ$ (sum of angles in a Δ)	✓S/R ✓S/R ✓answer/*antwoord* (3) ✓$\hat{G}_1 = 30^\circ$ ✓S/R ✓answer/*antwoord* (3) ✓$\hat{G}_1 = 30^\circ$ ✓S/R ✓answer/*antwoord* (3)

7.2	Perimeter of/*Omtrek van* PQRS = 12 cm $\text{One side/}\textit{Een sy} = \frac{12}{4} = 3 \text{ cm}$ $\therefore SR = 3cm$ PM = MR (diag. of *rhombus/rombus (ruit)* PQRS) PL = LS (given/*gegee*) In ΔPSR $LM = \frac{1}{2}SR$ (Midpoint thm/*Middelpuntstelling*) $= \frac{1}{2}(3)$ $= \frac{3}{2} = 1{,}5\ cm$	✓SR=PQ=QR=PS =3cm ✓S/R ✓S/R ✓answer/*antwoord* (4)
		[9]

QUESTION/*VRAAG* 8

8.1	Bisect/*Halveer mekaar*	✓ answer/*antwoord* (1)
8.2.1	A line drawn from the midpoint of one side of a triangle parallel to another side bisects the third side./*'n Lyn wat van die middelpunt van een sy van 'n driehoek parallel aan 'n ander sy getrek word, halveer die derde sy.* ***OR/OF*** Midpoint theorem	✓R (1) ✓R (1)
8.2.2 (a)	In $\Delta VWP \equiv \Delta VRS$ 1. WV = VR (proved/*bewys*) 2. VP = SV (given/*gegee*) 3. $\hat{V}_1 = \hat{V}_3$ (vert. opp ∠s) $\therefore \Delta VWP \equiv \Delta VRS$ (SAS)	✓S ✓S/R ✓ R (3)
8.2.2(b)	WV = VR (proved/*bewys*) VP = SV (given/*gegee*) ∴ SWPR is a/*'n* //^{m} (diagonals bisect each other/ *hoeklyne halveer mekaar*)	✓S ✓R (2)
8.2.2(c)	PQ ∥ SR (WP ∥ SR OR/OF proved OR/OF same str. line as WP) SP ∥ RQ (given/*gegee*) ∴ PQRS is a parallelogram (both pairs of opp. sides are // *beide pare teenoorg. sye is //*) **OR/*OF*** PQ ∥ SR (WP ∥ SR) PQ = SR (PQ = WP = SR, proved/*bewys*) ∴ PQRS is a //^{m} (one pair of opp. sides = and // *een paar teenoorg. sye = en//*) ***OR/OF*** VP = SV (given) $VP = \frac{1}{2}RQ$ (Mid. pnt thm) VP||RQ (V and P are mid. pnt) SP = RQ (V is the mid. pnt) ∴ PQRS is parm. (one pair = and ||)	✓S ✓R ✓R (3) ✓S ✓R ✓R (3) ✓S ✓S ✓R (3)

	OR/OF VP||RQ (V and P are the mid. pnt) ∴ SP||RQ (same str. line as VP) SR||PQ (same str. line as WP **OR/OF** proved) ∴ PQRS is parm. (both pairs of opp. sides are ||)	 ✓S/R ✓S ✓R (3)
8.2.3	SR = TW (RSTW is ∥gram) But SR = WP (proved/*bewys*) WP = QP (given/*gegee*) ∴ TQ = TW + WP + PQ = 3SR	✓S/R ✓S (2)
		[12]

TOTAL/TOTAAL: 100