Province of the
EASTERN CAPE
EDUCATION

NASIONALE SENIOR SERTIFIKAAT

GRAAD 10

NOVEMBER 2020

WISKUNDE V2 (EKSEMPLAAR)

PUNTE: **100**

TYD: **2 uur**

Hierdie vraestel bestaan uit 10 bladsye en ’n antwoordeboek van 14 bladsye.

INSTRUKSIES EN INLIGTING

Lees die volgende instruksies aandagtig deur voordat die vrae beantwoord word.

1. Hierdie vraestel bestaan uit 6 vrae.
2. Beantwoord AL die vrae in die SPESIALE ANTWOORDEBOEK wat verskaf word.
3. Dui ALLE berekeninge, diagramme, grafieke, ensovoorts wat jy gebruik in die beantwoording van die vrae, duidelik aan.
4. Slegs antwoorde sal NIE noodwendig volpunte verdien NIE.
5. Jy kan 'n goedgekeurde wetenskaplike sakrekenaar gebruik (nieprogrammeerbaar en niegrafies), tensy anders vermeld.
6. Indie nodig, rond antwoorde tot TWEE desimale plekke af, tensy anders vermeld.
7. Diagramme is NIE noodwendig volgens skaal geteken NIE.
8. Nommer die antwoord volgens die nommeringstelsel wat in die vraestel gebruik is.
9. Skryf netjies en leesbaar.

VRAAG 1

1.1 Die Wiskunde-toetspunte vir ’n graad10 A-klas is soos in die tabel hieronder aangedui. Daar is 28 leerlinge in die klas.

PUNTE	FREKWENSIE	MIDDELPUNT	MIDDELPUNT × FREKWENSIE
$0 < x \leq 30$	2	15	30
$30 < x \leq 40$	3	35	105
$40 < x \leq 50$	11	45	495
$50 < x \leq 60$	7	55	
$60 < x \leq 70$	3		195
$70 < x \leq 80$	2	75	150
$80 < x \leq 100$	0	90	0

1.1.1 Vooi die tabel deur die twee ontbrekende waardes te bereken. (2)

1.1.2 Bereken die benaderde gemiddelde waarde. (2)

1.1.3 Stel die data op ’n frekwensie-poligoon voor. (3)

1.1.4 In watter interval sal die:

(a) mediaan lê? (2)

(b) 80^{ste} persentiel lê? (2)

1.2 Die Wiskunde-toetspunte vir die graad 10-B klas is as volg:

45	49	50	51	51	53	54	57	57	59	60	64
65	66	70	71	73	74	75	76	83	89	89	

1.2.1 Skyf neer wat die mediaanpunt vir hierdie klas is. (1)

1.2.2 Bereken die interkwartiel variasiewydte vir hierdie klas. (3)

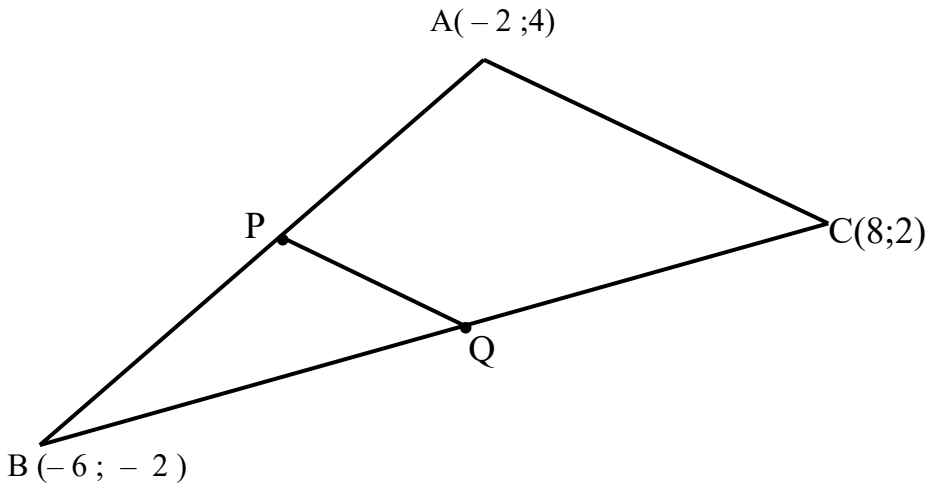
1.2.3 Stel die data op ’n mond-en-snordiagram voor. (3)

1.2.4 Lewer kommentaar oor die verspreiding van die data met verwysing na die mond-en-snordiagram. (2)

[20]

VRAAG 2

In die diagram hieronder word die koördinate van Δ ABC gegee as A(– 2 ; 4) , B(– 6 ; – 2) en C(8 ; 2). P en Q is die middelpunt van AB en BC onderskeidelik.



2.1 Bereken die koördinate van P en Q. (4)

2.2 Toon aan dat:

2.2.1 PQ // AC (4)

2.2.2 $PQ = \frac{1}{2}\ AC$ (4)

2.3 Bepaal, korrek tot twee desimale plekke, die omtrek van Δ ABC. (4)
[16]

VRAAG 3

3.1 Indien $x = 229{,}5°$ en $y = 117{,}6°$, bereken korrek tot twee desimale plekk die waardes van:

3.1.1 $\sin(x + y)$ (2)

3.1.2 $\cos 2y$ (2)

3.1.3 $\text{cosec } x$ (2)

3.2 Bepaal, korrek tot een desimale plek, die waarde van x:

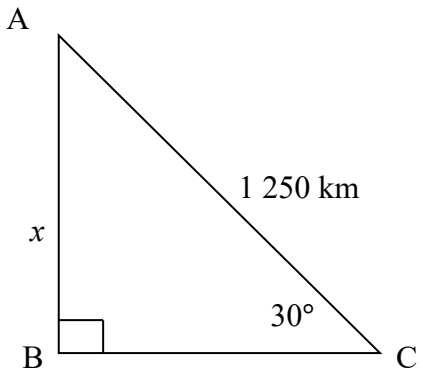
3.2.1 $\cos 2x = 0{,}50$ (2)

3.2.2 $7 \sec x - 11 = 0$ (3)

3.3 As $\cos x = \frac{3}{4}$ en $0° < x < 90°$, bepaal die waarde van $\tan x$. (3)

3.4 As $\tan \theta = \frac{6}{8}$ en $\sin \theta < 0$, bepaal die waarde van $\sec\theta - \text{cosec } \theta$ (5)

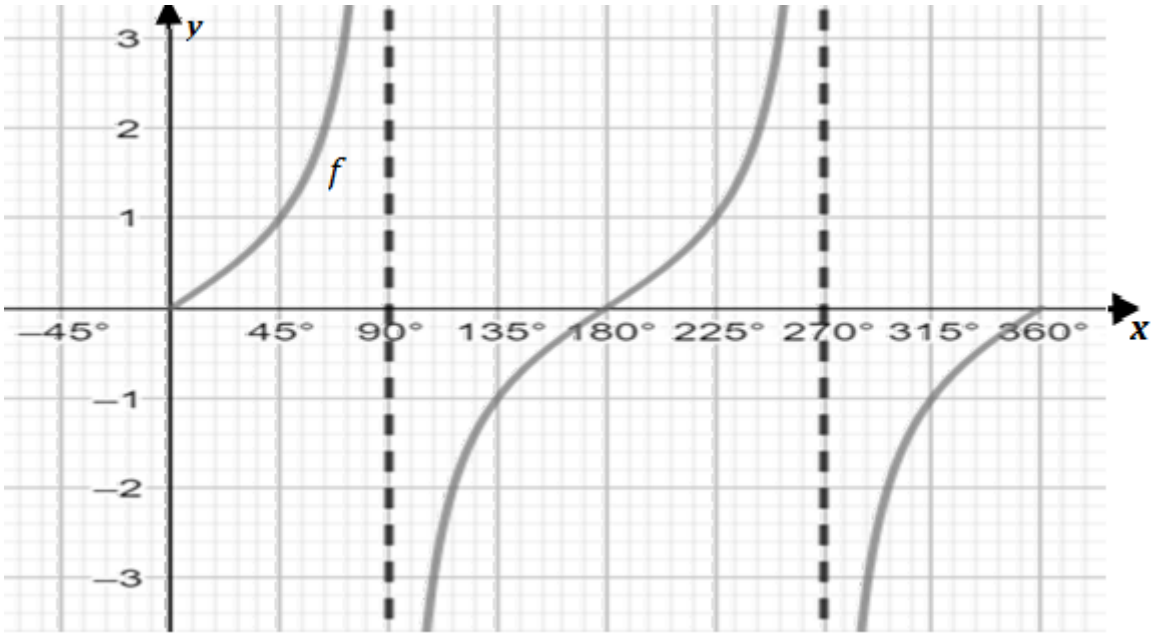
3.5 Sonder om 'n sakrekenaar te gebruik, bepaal die waarde van x in die diagram hieronder.



(2)
[21]

VRAAG 4

In die diagram hieronder is die grafiek van $f(x) = \tan x$ geteken vir $x \in [0° ; 360°]$.



4.1 Teken op dieselfde assestelsel die grafiek van $g(x) = \sin 2x$ vir $x \in [0° ; 360°]$. (4)

4.2 Wat is die amplitude van f? (1)

4.3 Skryf die periode van g neer. (1)

4.4 Vir watter waarde(s) van x is:

4.4.1 $f(x) < 0$ (2)

4.4.2 $f(x) \cdot g(x) < 0$ (2)

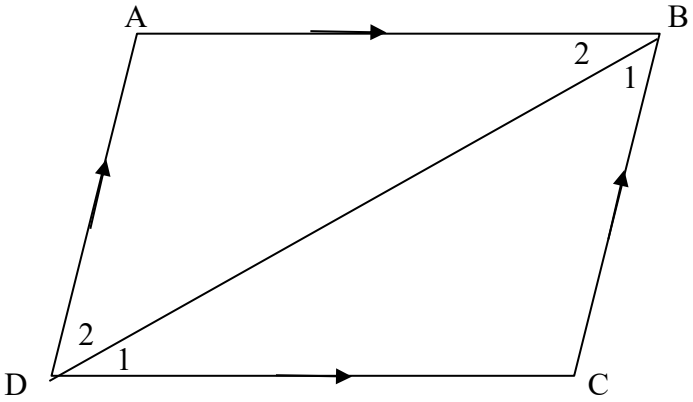
4.5 Skryf die waardeversameling van $k(x)$ as $k(x) = g(x) - 1$ neer. (2)

[12]

VRAAG 5

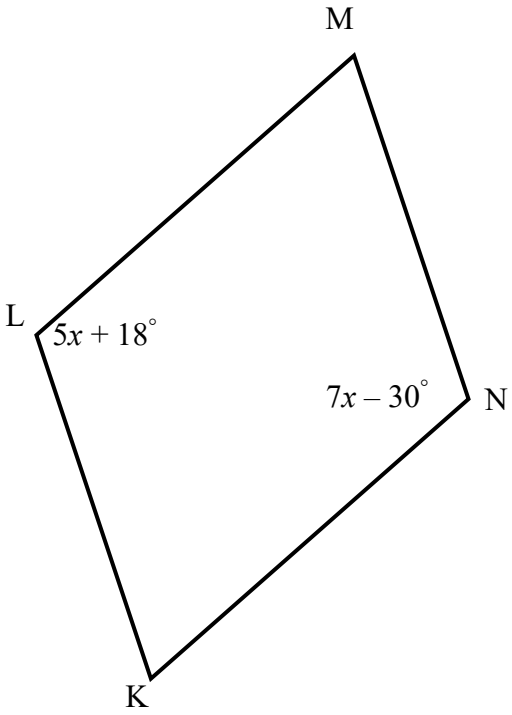
5.1 Gebruik die diagram hieronder om te bewys dat die teenoorstaande sye van 'n parallelogram gelyk is, m.a.w. AB = CD and AD = BC.

Wenk: bewys dat Δ ABD ≡ Δ CDB



(4)

5.2 In die diagram hieronder is KLMN 'n parallelogram met $\widehat{N} = 7x - 30°$ en $\widehat{L} = 5x + 18°$.

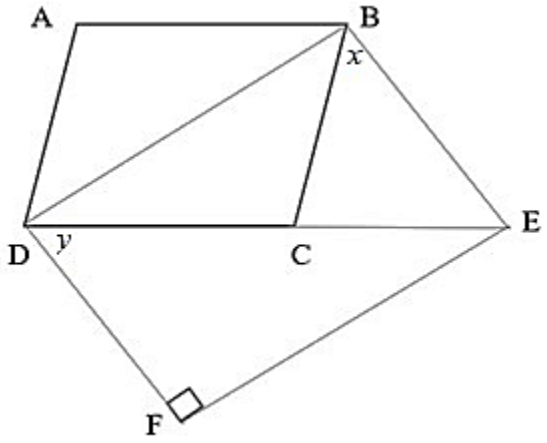


5.2.1 Bereken die waarde van x. (4)

5.2.2 As dit verder gegee word dat $L\widehat{K}N = 4y$, bepaal die waarde van y. (3)

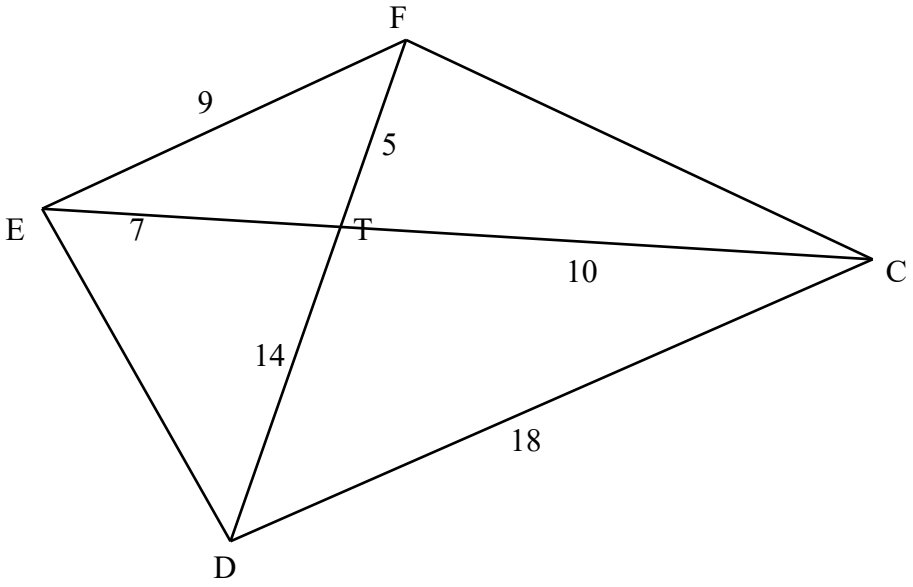
5.3 In die onderstaande diagram is ABCD 'n parallelogram met AD = BE, $\widehat{A} = 124°$, ED halveer $B\widehat{E}F$ en BEFD is 'n vierhoek.

Bereken met redes die waardes van x en y.



(6)

5.4 In die diagram hieronder is FT = 5 cm, ET = 7 cm, EF = 9 cm, CT = 10 cm, DT = 14 cm en CD = 18 cm.



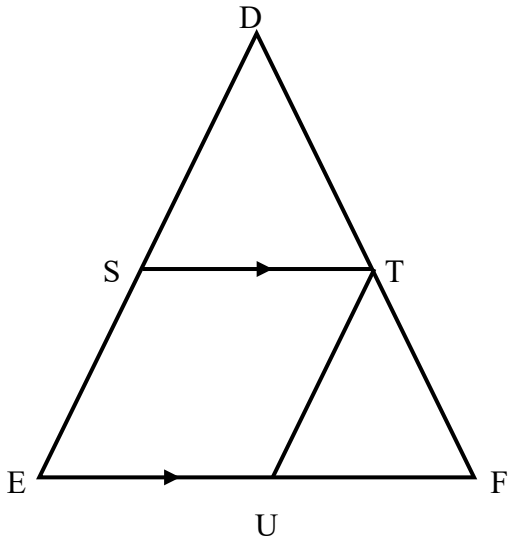
5.4.1 Bewys dat Δ EFT ||| Δ DCT. (3)

5.4.2 As dit verder gegee word dat $D\hat{F}C = T\hat{D}C$, bewys dat $F\hat{E}C = T\hat{F}C$. (3)

5.5 5.5.1 Voltooi die volgende stelling vir Δ ABC:

Indien D 'n punt is op lyn AB en E is 'n punt op lyn AC sodat AD = DB en DE || BC, dan is … (1)

5.5.2 In Δ DEF, DS = SE , EU = UF and ST || EF.



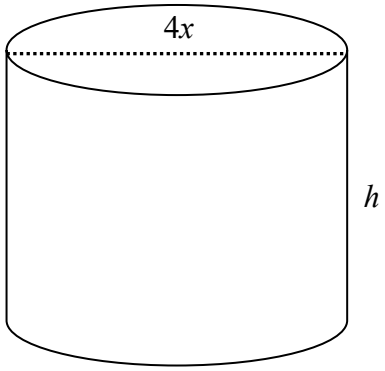
Bewys dat SEUT 'n parallelogram is. (4)

[28]

VRAAG 6

Die silinder hieronder het 'n middellyn van $4x$ eenhede en 'n hoogte van h meter. Die silinder is oop aan die bokant en sy totale buite-oppervlakte is gelyk aan 32π meter.

Bereken die hoogte van die silinder h, in terme van x.



(3)
[3]

TOTAAL: 100

Province of the
EASTERN CAPE
EDUCATION

LEARNER'S NAME: *LEERDERNAAM:*	

GRADE 10 *GRAAD 10*	

NATIONAL/*NASIONALE* SENIOR CERTIFICATE/*SERTIFIKAAT*

GRADE 10/*GRAAD 10*

NOVEMBER 2020

MATHEMATICS P2/*WISKUNDE V2* SPECIAL ANSWER BOOK/*SPESIALE ANTWOORDEBOEK* (EXEMPLAR/*EKSEMPLAAR)*

Marker/*Merker*					**Moderator's Initials / *Moderator se paraaf***															
Question *Vraag*	**Marks** *Punte*			**Initial** Parafeer	**Marks** *Punte*			**S M**	**Marks** *Punte*			**D M**	**Marks** *Punte*			**P M**	**Marks** *Punte*			**NM**
1																				
2																				
3																				
4																				
5																				
6																				
TOTAL *TOTAAL*																				

This special answer book consists of 14 pages./
Hierdie spesiale antwoordeboek bestaan uit 14 bladsye.

QUESTION 1/*VRAAG 1*

Solution / *Oplossing* | **Marks / *Punte***

1.1.1

Marks/ *Punte*	**Frequency/ *Frekwensie***	**Midpoints/ *Middelpunt***	**Midpoint × Frequency/ *Middelpt × Frekwensie***
$0 < x \leq 30$	2	15	30
$30 < x \leq 40$	3	35	105
$40 < x \leq 50$	11	45	495
$50 < x \leq 60$	7	55	
$60 < x \leq 70$	3		195
$70 < x \leq 80$	2	75	150
$80 < x \leq 100$	0	90	0

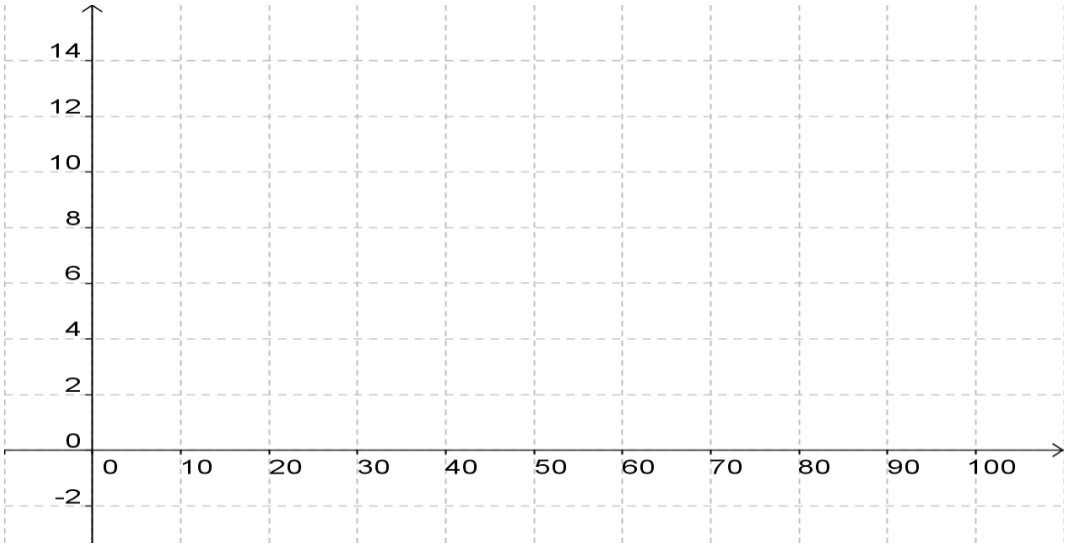
(2)

1.1.2

(2)

1.1.3

FREQUENCY POLYGON OF GRADE 10 MATHEMATICS CLASS
FREKWENSIE-POLIGOON VAN *GRAAD 10 WISKUNDEKLAS*



GRADE 10 MATHEMATICS MARKS
GRAAD 10 WISKUNDEPUNTE

(3)

1.1.4 (a)

(2)

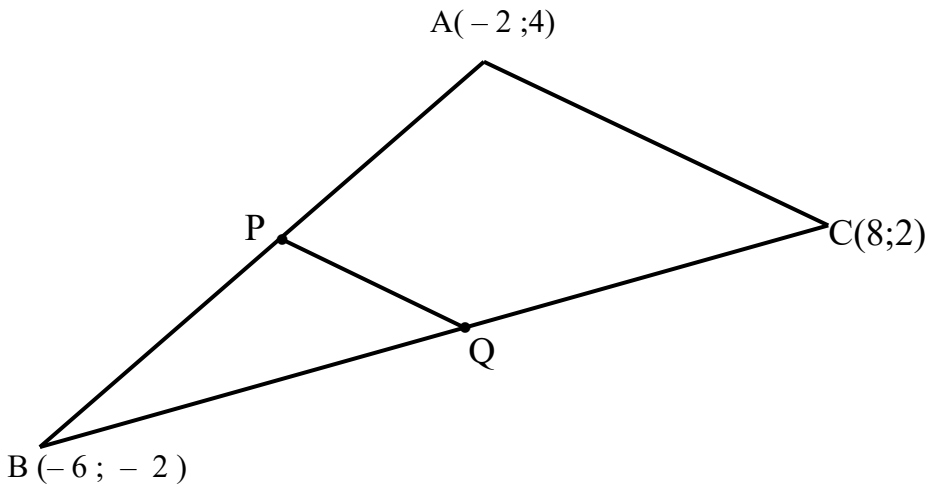
1.1.4 (b)

(2)

1.2		

45	49	50	51	51	53	54	57	57	59	60	64
65	66	70	71	73	74	75	76	83	89	89	

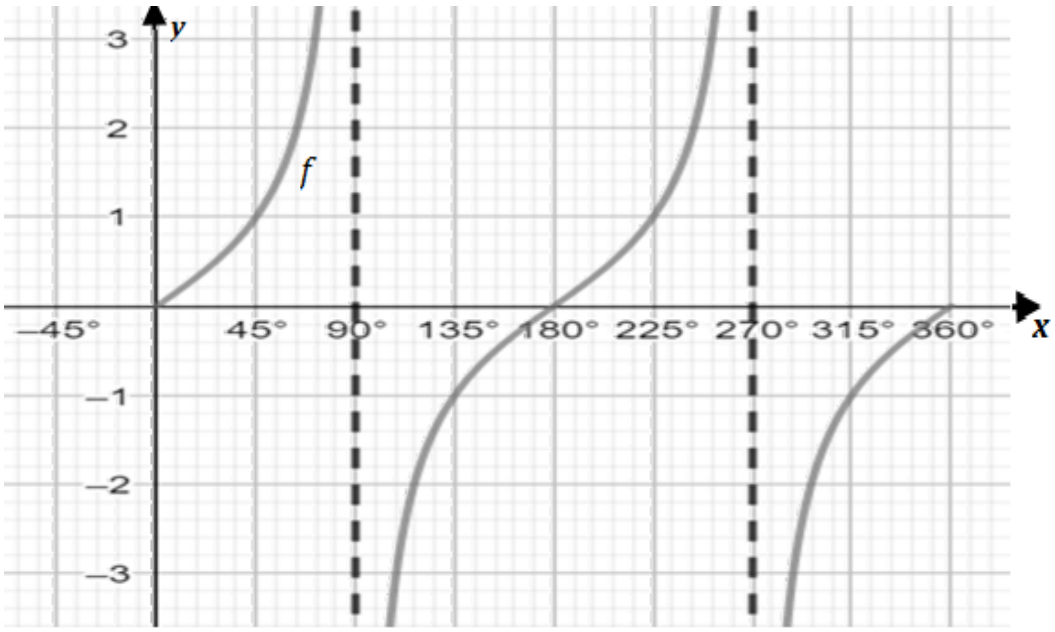
1.2.1		(1)
1.2.2		(3)
1.2.3		(3)
1.2.4		(2)
		[20]

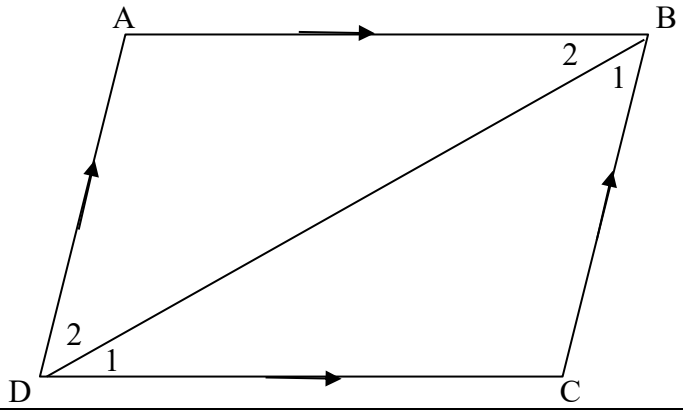
QUESTION 2/*VRAAG 2*		
	Solution / *Oplossing*	**Marks** ***Punte***
		
2.1		(4)
2.2.1		(4)

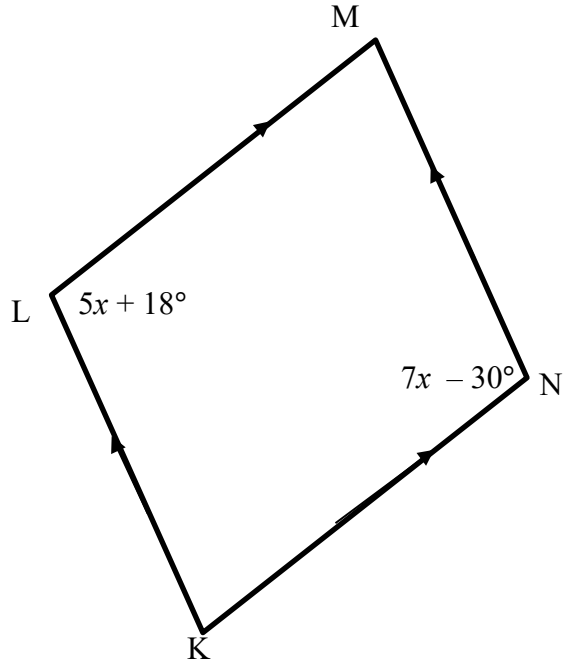
2.2.2		(4)
2.3		(4)
		[16]

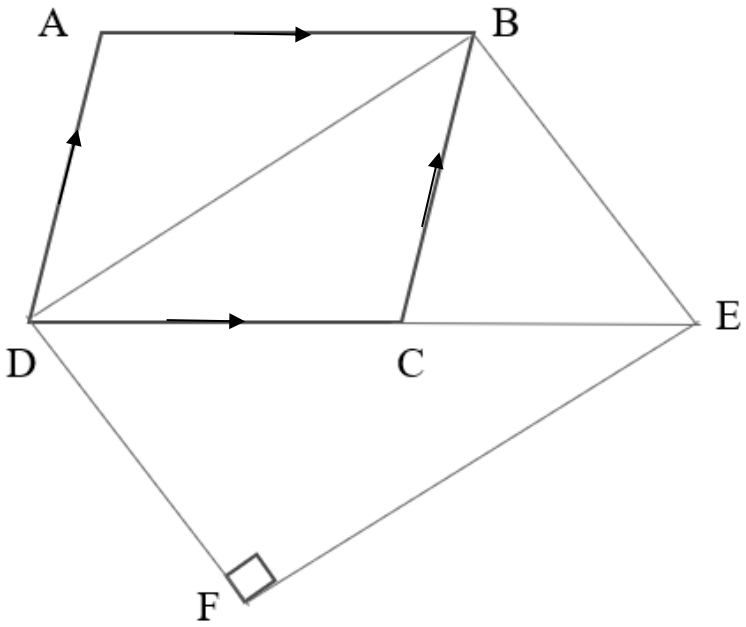
QUESTION 3 / *VRAAG 3*		
	Solution / *Oplossing*	**Marks** ***Punte***
3.1.1		(2)
3.1.2		(2)
3.1.3		(2)
3.2.1		(2)
3.2.2		(3)

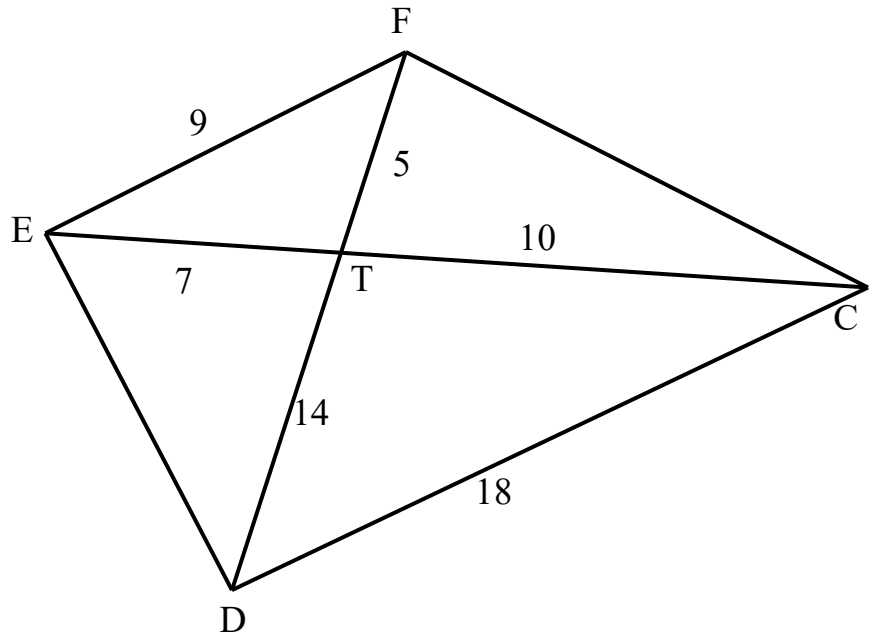
	Solution / *Oplossing*	**Marks** ***Punte***
3.3		(3)
3.4		(5)
3.5		(2)
		[21]

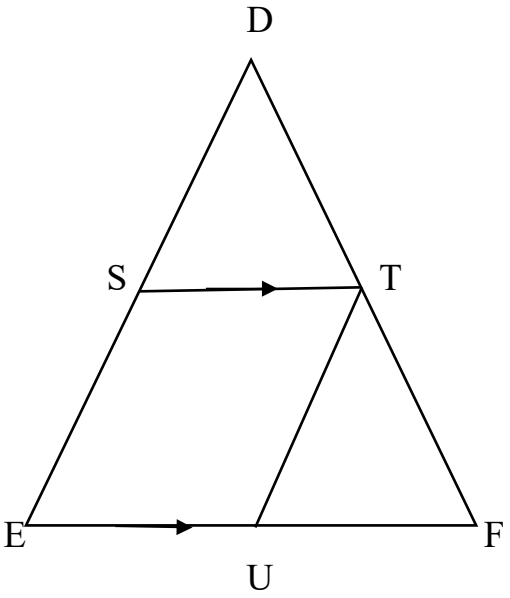
QUESTION 4 / *VRAAG 4*		
	Solution / *Oplossing*	**Marks** ***Punte***
4.1.		(4)
4.2		(1)
4.3		(1)
4.4.1		(2)
4.4.2		(2)
4.5		(2)
		[12]

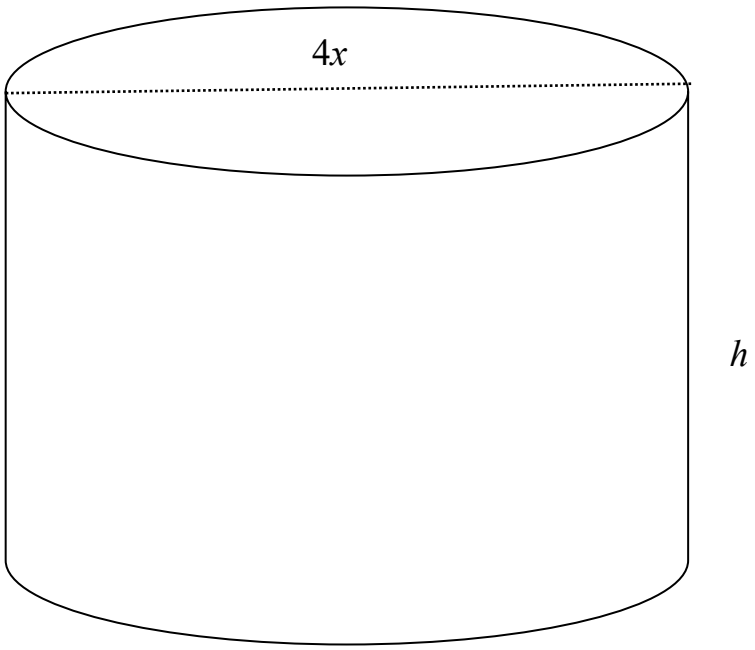
QUESTION 5/*VRAAG 5*		
	Solution / *Oplossing*	**Marks** ***Punte***
5.1		
		(4)

	Solution / *Oplossing*	**Marks** ***Punte***
5.2		
5.2.1		(4)
5.2.2		(3)

	Solution / *Oplossing*	**Marks** ***Punte***
5.3		
		(6)

	Solution / *Oplossing*	**Marks** ***Punte***
5.4		
5.4.1		(3)
5.4.2		(3)

	Solution / *Oplossing*	**Marks** ***Punte***
5.5.1		(1)
5.5.2		
		(4)
		[28]

QUESTION 6 / *VRAAG 6*		
	Solution / *Oplossing*	**Marks** ***Punte***
		
		(3)
		[3]
	TOTAL/*TOTAAL*:	**100**

Province of the
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EDUCATION

NATIONAL SENIOR CERTIFICATE
NASIONALE SENIOR SERTIFIKAAT

GRADE/*GRAAD* 10

NOVEMBER 2020

MATHEMATICS P2/*WISKUNDE V2*
MARKING GUIDELINE/*NASIENRIGLYN*
(EXEMPLAR/*EKSEMPLAAR*)

MARKS/*PUNTE*: 100

This marking guideline consists of 11 pages./
Hierdie nasienriglyn bestaan uit 11 bladsye.

QUESTION 1/*VRAAG 1*

1.1

Marks/ ***Punte***	**Frequency/** ***Frekwensie***	**Midpoints/** ***Middelpt***	**Midpoint × Frequency/** ***Middelpt × Frekwensie***
$0 < x \leq 30$	2	15	30
$30 < x \leq 40$	3	35	105
$40 < x \leq 50$	11	45	495
$50 < x \leq 60$	7	55	**385**
$60 < x \leq 70$	3	**65**	195
$70 < x \leq 80$	2	75	150
$80 < x \leq 100$	0	90	0
	28		1360

✓ 385
✓ 65

(2)

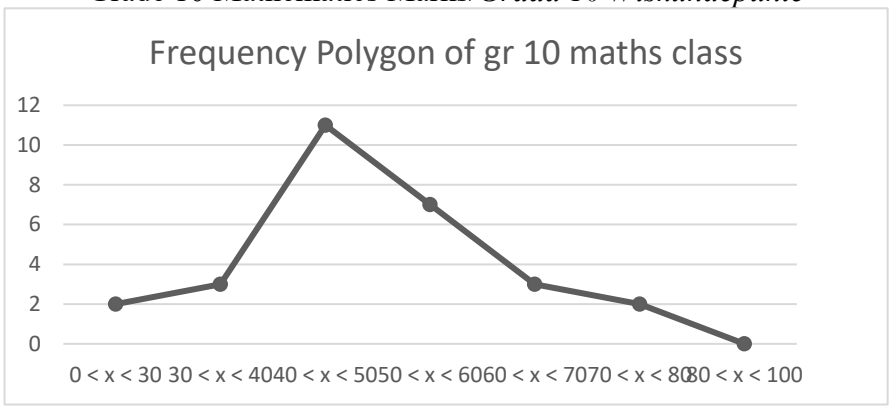
1.1.2 Estimate of the mean/*Benaderde gemiddelde* $= \frac{1360}{28}$
$= 48{,}6$

✓ 1360
✓ 48,6

(2)

1.1.3

Grade 10 Mathematics Marks/*Graad 10 Wiskundepunte*



✓✓ mdpts / *middelpunte*

Line joining midpoints / *Lyn verbind middelpunte*

(3)

1.1.4 (a) $40 < x \leq 50$

✓ Endpoint / *Eindpunt*
✓ Notation / *Notasie*

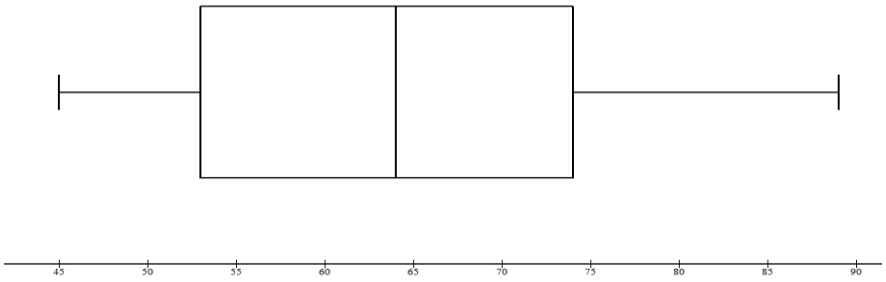
(2)

1.1.4 (b) 2,4

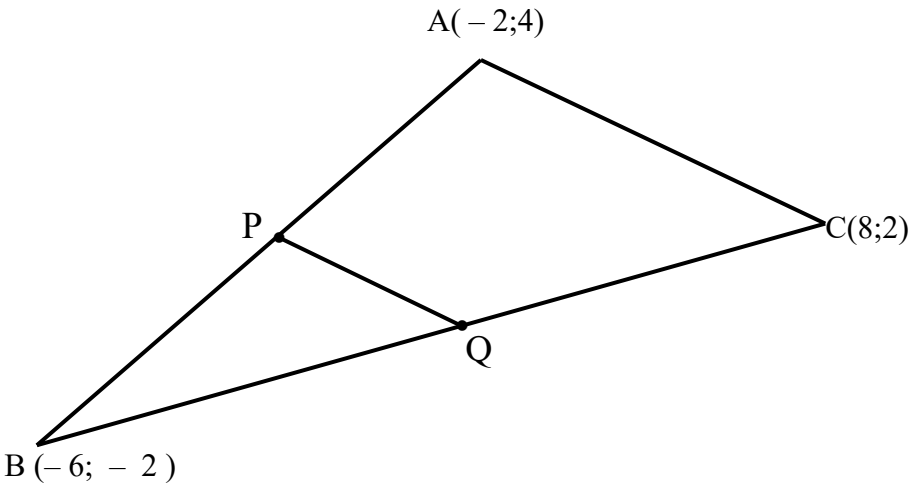
$50 < x \leq 60$

✓ 22,4
✓ Interval / *Interval*

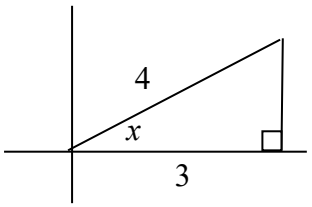
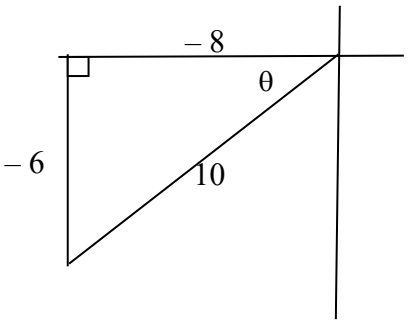
(2)

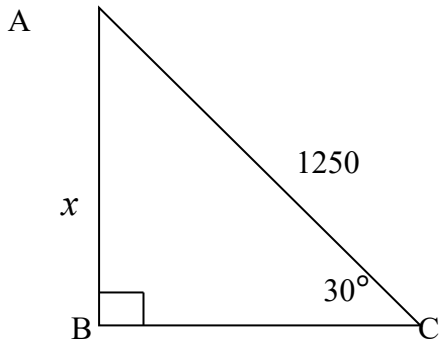
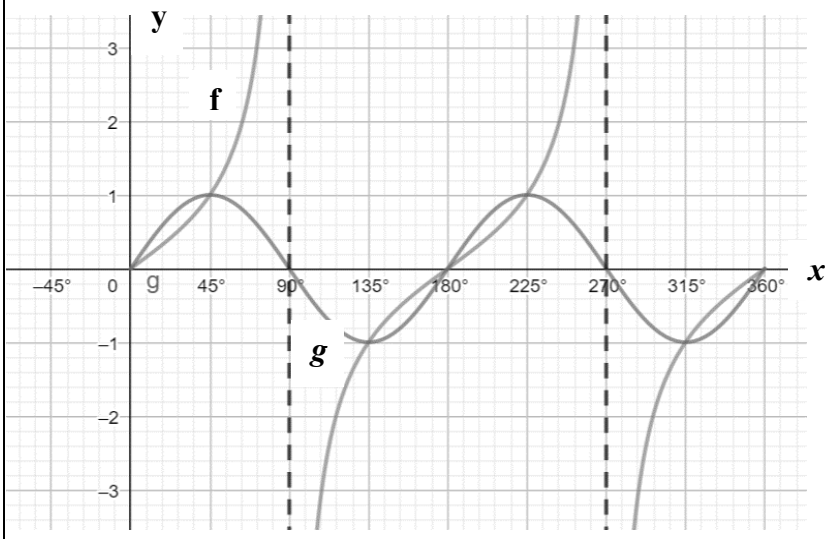
1.2	<table><tr><td>45</td><td>49</td><td>50</td><td>51</td><td>51</td><td>53</td><td>54</td><td>57</td><td>57</td><td>59</td><td>60</td><td>64</td></tr><tr><td>65</td><td>66</td><td>70</td><td>71</td><td>73</td><td>74</td><td>75</td><td>76</td><td>83</td><td>89</td><td>89</td><td></td></tr></table>		
1.2.1	Median = 64	✓answer / *antwoord*	(1)
1.2.2	IQR = Q_3 – Q_1 = 74 – 53 = 21	✓ Q_3 ✓ Q_1 ✓ answer / *antwoord*	(3)
1.2.3		✓ Min./*Min.* Max./*Maks*. ✓ Q_1 Q_3 ✓ Q_2	(3)
1.2.4	Skewed to the left / *Skeef na links*	✓✓ answer / *antwoord*	(2)
			[20]

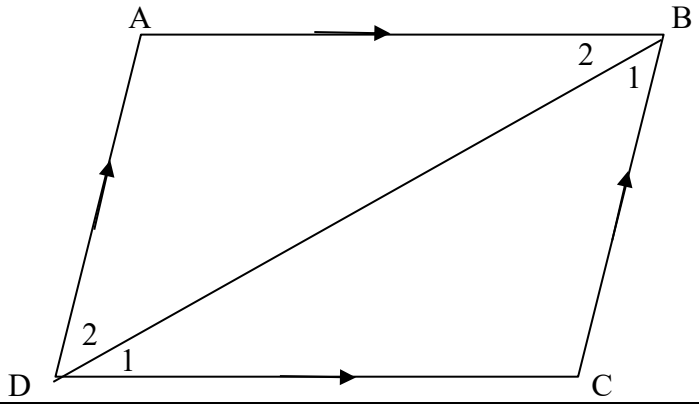
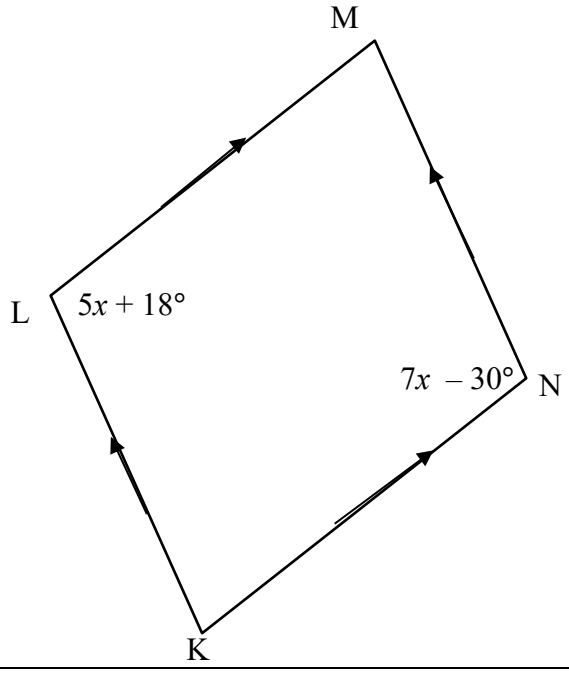
QUESTION 2/*VRAAG 2*

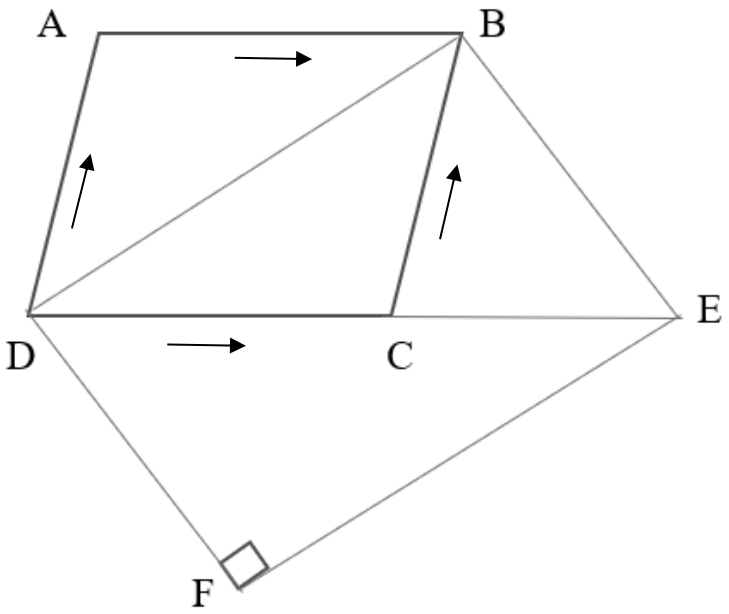


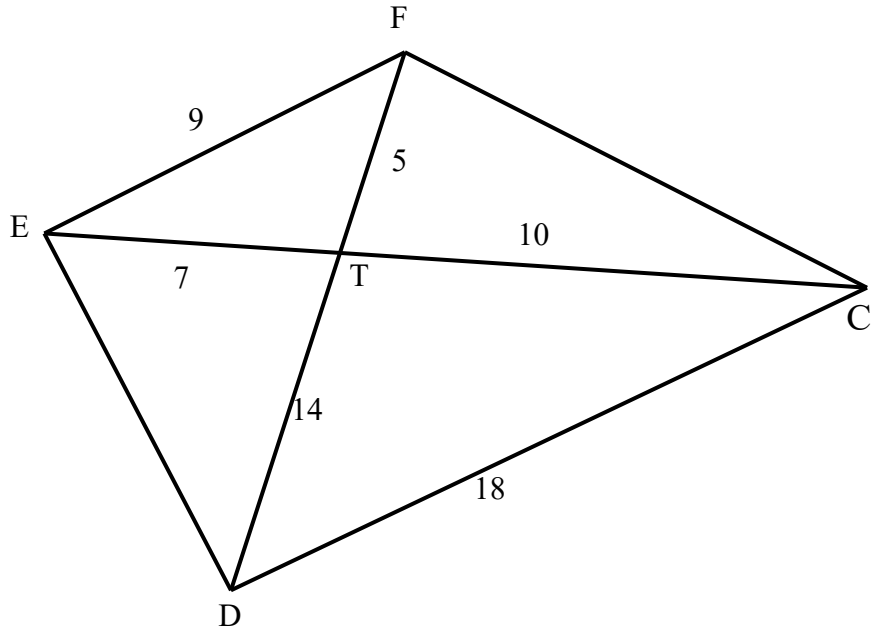
2.1	$P_{\text{midpoint/}middelpunt} = \left(\frac{-6+(-2)}{2};\frac{4+(-2)}{2}\right)$ $Q_{\text{midpoint/}middelpunt} = \left(\frac{-6+8}{2};\frac{-2+2}{2}\right)$ $P = (-4;1)$ $Q = (1;0)$	✓form / *vorm* ✓ P ✓form / *vorm* ✓Q	(4)
2.2.1	Gradient of/Gradiënt van $PQ = m_{PQ} = \frac{0-1}{1-(-4)} = -\frac{1}{5}$ Gradient of/Gradiënt van $AC = m_{AC} = \frac{2-4}{8-(-2)} = -\frac{1}{5}$	✓ form/ *vorm* ✓m_{PQ} ✓ form/ *vorm* ✓m_{AC}	(4)
2.2.2	Distance of/*Afstand van* $PQ = d_{PQ} = \sqrt{(1-(-4))^2+(0-1)^2}$ $= \sqrt{26}$ $= 5{,}1$ Distance of/*Afstand van* $AC = d_{AC} = \sqrt{(8-(-2))^2+(2-4)^2}$ $= \sqrt{104}$ $= 10{,}2$ $\therefore PQ = \frac{1}{2}AC$	✓ form/ *vorm* ✓d_{PQ} ✓ form/ *vorm* ✓d_{AC}	(4)
2.3	Distance of/*Afstand van* AB $d_{AB} = \sqrt{(-2-(-6))^2+(4-(-2))^2}$ $= \sqrt{52}$ Distance of/*Afstand van* BC $d_{BC} = \sqrt{(8-(-6))^2+(2-(-2))^2}$ $= \sqrt{212}$ $\therefore$ perimeter $= \sqrt{52} + \sqrt{212} + \sqrt{104}$ $= 31{,}97$	✓ d_{AB} ✓d_{BC} ✓add / *optel* ✓answer / *antwoord*	(4)
			[16]

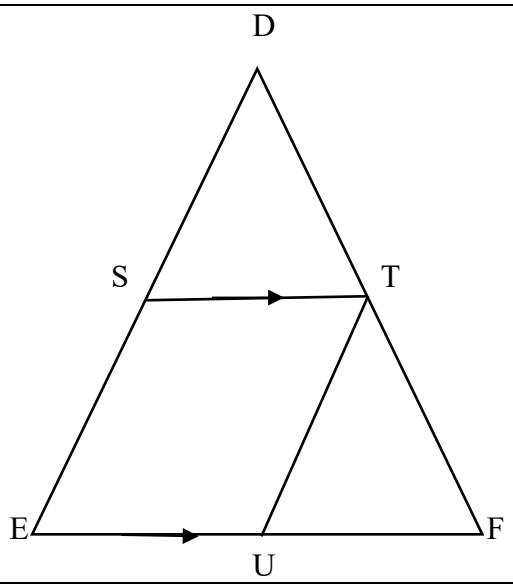
QUESTION 3 / *VRAAG 3*			
3.1.1	$\sin(x+y)$ $= \sin(229{,}5° + 117{,}6°) = -0{,}22$	✓substitution / *vervanging* ✓answer / *antwoord*	(2)
3.1.2	$\cos 2y$ $= \cos(2\times 117{,}6°) = -0{,}57$	✓substitution / *vervanging* ✓answer / *antwoord*	(2)
3.1.3	$\text{cosec } x$ $= \frac{1}{\sin 229{,}5^0} = -1{,}32$	✓✓answer/ *antwoord*	(2)
3.2.1	$\cos 2x = 0{,}5$ $2x = 60°$ $x = 30°$	✓ 60° ✓ 30°	(2)
3.2.2	$7\sec x - 11 = 0$ $\sec x = \frac{11}{7}$ $\cos x = \frac{7}{11}$ $x = 50{,}5°$	✓sec x ✓cos x ✓answer/*antwoord*	(3)
3.3	$\text{opp}^2 = 4^2 - 3^2$ $\text{opp} = \sqrt{7}$ $\therefore \tan x = \frac{\sqrt{7}}{3}$ 	✓opp/*teenoorg.* ✓diagram/ *diagram* ✓answer/*antwoord*	(3)
3.4	$\text{hyp}^2 = 6^2 + 8^2$ $\text{hyp} = 10$ $\sec\theta - \text{cosec}\,\theta$ $= \frac{10}{-8} - \frac{10}{-6}$ $= \frac{5}{12}$ 	✓hyp/*skuinssy* ✓quadr/*kwadr* ✓ – 8 and/e*n* – 6 ✓substitution/ *vervanging* ✓answer/*antwoord*	(5)

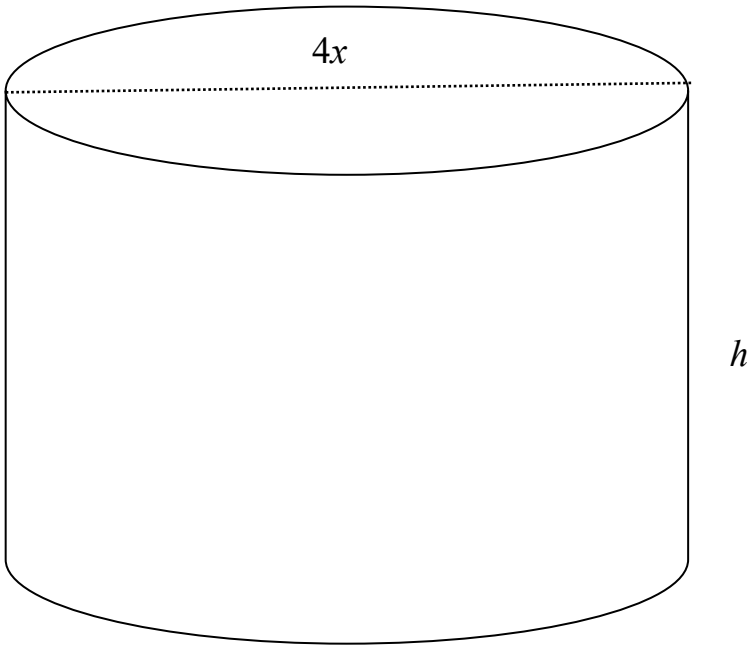
3.5	$\sin 30^0 = \frac{x}{1250}$ $x = 625$ 	✓correct ratio/ *korrekte verhoud.* ✓answer/*antwoord*	(2)
			[21]
QUESTION 4 / *VRAAG 4*			
4.1.		✓ (0;0) ✓ shape/*vorm* ✓ period/*periode* ✓ amplitude	(4)
4.2	Amplitude of/*van* $f = \infty$	✓answer / *antwoord*	(1)
4.3	Period of/*Periode van* g is 180°	✓answer / *antwoord*	(1)
4.4.1	$90° < x < 180°$ and/*en* $270° < x < 360°$	✓ 1st int/*1ste int* ✓ 2nd int/2de int	(2)
4.4.2	$90° < x < 180°$	✓endpt. / *eindpt.* ✓notation / *notasie*	(2)
4.5	Range of / *Waardeversameling van* $k(x)$ if / *as* $k(x) = g(x) - 1$ $-2 \leq y \leq -1$	✓endpt. / *eindpt.* ✓notation / *notasie*	(2)
			[12]

QUESTION 5/*VRAAG 5*			
5.1			
	BD is common / *gemeen* $\hat{B}_1 = \hat{D}_2$ (alt / *verwisselende* ∠, AB // CD) $\hat{B}_2 = \hat{D}_1$ (alt / *verwisselende* ∠, BC // AD) ∴ ΔABD ≡ ΔCDB (∠, ∠, S) ∴ AB = CD and / *en* AD = BC (≡ Δ's / *e*)	✓ common / *gemeen* ✓SR ✓SR ✓∠, ∠, S	(4)
5.2			
5.2.1	$5x + 18° = 7x - 30°$ (opposite ∠'s of a parallelogram / *teenoorste ∠e van 'n parallelogram*) $-2x = -30° - 18°$ $-2x = -48°$ $x = 24°$	✓ SR ✓ $-2x$ ✓ $-48°$ ✓ Ans. /*Antw.* = 24°	(4)

5.2.2	$5(24°) + 18° + 4y = 180°$ (Co-int ∠'s / *Ko-binne ∠'e* LM || KN) $4y = 180° - 138°$ $y = 10{,}5°$	✓ SR ✓ $4y = 42°$ ✓ Answer / *Antw.* $= 10{,}5°$	(3)
5.3			
	$B\hat{C}D = 124°$ (opp angles of parallelogram are equal / *teenoorste ∠e van 'n parallelogram*) $B\hat{C}E = 56°$ (angles on str line / *∠e op 'n reguit lyn*) $B\hat{C}E = \hat{E}$ (base ∠'s of isosceles triangle / *teenoorste ∠e van 'n parallelogram*) $x = 180° - (56° + 56°)$ (angles of a triangle) $= 68°$ $D\hat{E}F = 56°$ $\therefore y = 34°$ (angles of a triangle)	✓SR ✓ S ✓ S ✓ $x = 68°$ ✓ $D\hat{E}F$ $= 56°$ ✓ $y = 34°$	(6)

5.4			
5.4.1	In Δ FTE and / *en* Δ CTD: $\frac{FT}{TC} = \frac{ET}{TD} = \frac{EF}{CD} = \frac{1}{2}$ $\therefore \Delta$ EFT ||| Δ DCT (sides are in proportion / *sye is eweredig*)	✓ratio / *verhouding* ✓ratio / *verhouding* ✓ R	(3)
5.4.2	$F\hat{E}C = T\hat{D}C$ (|||) But / *Maar* $D\hat{F}C = T\hat{D}C$ (given / *gegee*) $\therefore F\hat{E}C = T\hat{D}C = T\hat{F}C$	✓ R ✓ given /*gegee* ✓ conclusion / *gevolgtrekking*	(3)
5.5.1	AE = EC and /*en* DE = $\frac{1}{2}$BC	✓ S	(1)

5.5.2			
	ST || EF (given / *gegee*) DT = TF (converse of midpoint theorem / *omgekeerde van middelpuntstelling*) ∴ TU || SE (converse of midpoint theorem / *omgekeerde van middelpuntstelling*) ∴ SEUT is a parallelogram / *'n parallelogram* (both pairs of opposite sides ||/beide pare teenoorstaande sye is ||)	✓✓SR ✓ R ✓ R	(4)
			[28]

QUESTION 6 / *VRAAG 6*			
			
	TSA of an open cylinder / *TBO van 'n oop silinder* $= \pi \times r^2 + 2 \times \pi \times r \times h$ $32\pi = \pi \times (2x)^2 + 2 \times \pi \times 2x \times h$ $h = \frac{32\pi - 4\pi x^2}{4\pi x}$ $h = \frac{8}{x} - x$	✓ formula / *formule* ✓ subst / *vervanging* ✓ Answer of *h* in terms of *x* / *Antwoord van h in terme van x*	(3)
			[3]
		TOTAL/*TOTAAL*:	**100**