education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

MATHEMATICS P2

EXEMPLAR PAPER

MARKS: 100

TIME: 2 hours

This question paper consists of 9 pages.

Graph paper should be provided to the candidates.

153 2 E

INSTRUCTIONS ANDINFORMATION

Read the following instructions carefully before answering the questions:

1. This question paper consists of SIX questions. Answer ALL the questions.

2. Clearly show ALL the calculations, diagrams, graphs, et cetera you have used in determining the answers.

3. An approved calculator (non-programmable and non-graphical) may be used, unless stated otherwise.

4. If necessary, answers should be rounded off to TWO decimal places, unless stated otherwise.

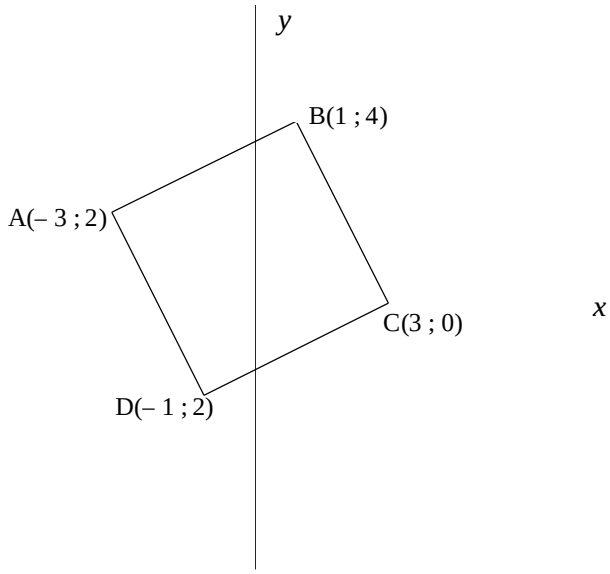
5. Number the answers EXACTLY as the questions are numbered.

6. Diagrams are NOT necessarily drawn to scale.

7. It is in your own interest to write legibly and to present the work neatly.

QUESTION 1

Given points A (-3 ; 2), B (1 ; 4), C (3 ; 0) and D (-1 ; -2) in a Cartesian plane, answer the questions below:



1.1 Calculate the following:

1.1.1 The gradients of AB and DC (5)

1.1.2 The lengths of AB and DC (5)

1.1.3 The gradients of AC and BD (4)

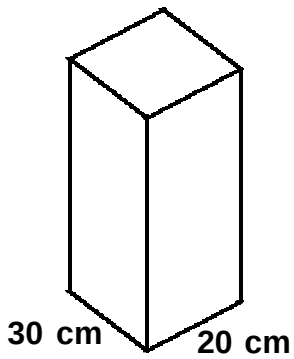
1.2 What special shape does the quadrilateral ABCD represent? Give a reason for your answer. (3)

[17]

QUESTION 2

2.1 A mechanic uses 36 000 cm^3 of oil to fill a tank which is in the shape of a rectangular prism. The base of the tank measures 30 cm by 20 cm.

What is the height of the tank?



(4)

2.2 By how much will the volume of the tank increase if the length and breadth of the tank is doubled and the height remains the same? What is this new volume? (4)

[8]

QUESTION 3

3.1 Draw, on the graph paper provided, the pentagon whose vertices has the following co-ordinates:

P (-1 ; 5), Q (4 ; 3), R (2 ; -2), S (-2 ; -3) and T (-4 ; 1)

Now construct, on the same system of axes, the pentagon formed by shifting PQRST 2 units downwards and 3 units to the right. Indicate the co-ordinates of the vertices. (10)

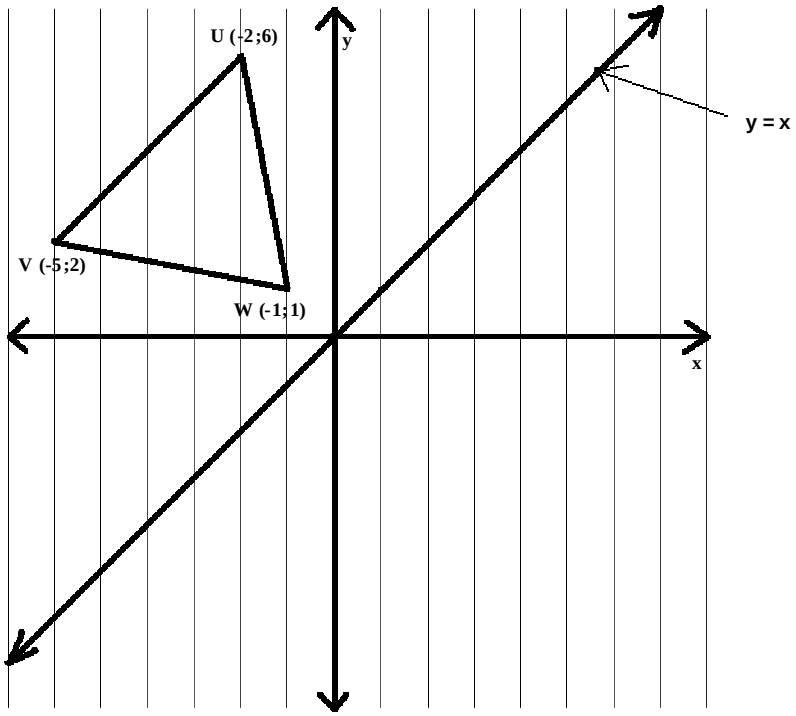
3.2 A (0 ; 4), B (-4 ; 0), C (-1 ; -1) and D (3 ; 3) are the co-ordinates of the vertices of a parallelogram ABCD in a Cartesian plane.

3.2.1 Show that the co-ordinate of E, the point of intersection of the diagonals of the parallelogram ABCD, are $\left(-\frac{1}{2}\ ;\ \frac{3}{2}\right)$. (3)

3.2.2 If ABCD is moved such that the co-ordinates of E now becomes $\left(5;\ \frac{3}{2}\right)$, describe the shift of the parallelogram. (2)

3.2.3 Determine the new co-ordinates of $A^{/}$ and $C^{/}$. (4)

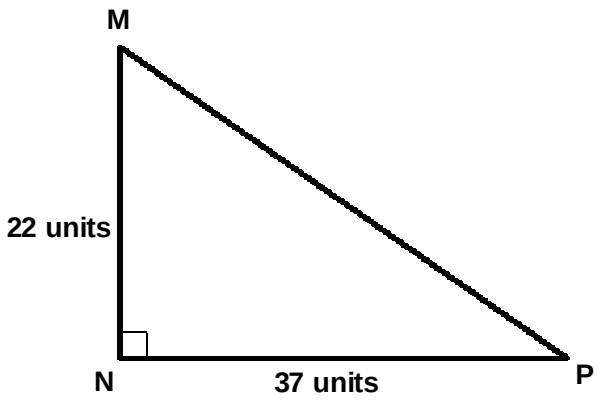
3.3 In the diagram below, Δ UVW has co-ordinates U (-2 ; 6), V (-5 ; 2) and W (-1 ; 1). If Δ UVW is reflected along the line $y = x$, draw Δ $U'V'W'$ (on the grid provided) and write down the co-ordinates of U', V' and W'.



(6)
[25]

QUESTION 4

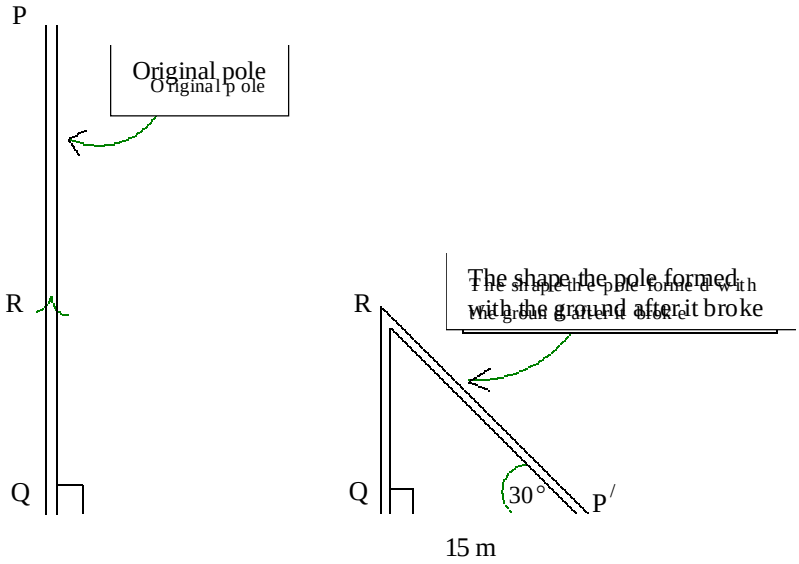
4.1 In ? MNP, MN = 22 units, $\hat{N} = 90^o$ and NP = 37 units. Determine $\hat{P}$ (correct to ONE decimal place).



(3)

4.2 A pole PQ broke at point R which resulted in the top portion of the pole, PR, forming an angle of 30º with the ground at P/, now 15 m away from Q, the foot of the pole.

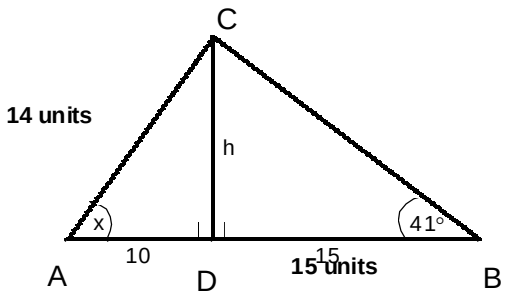
Calculate the original height PQ of the pole (correct to ONE decimal place).



(5)
[8]

QUESTION 5

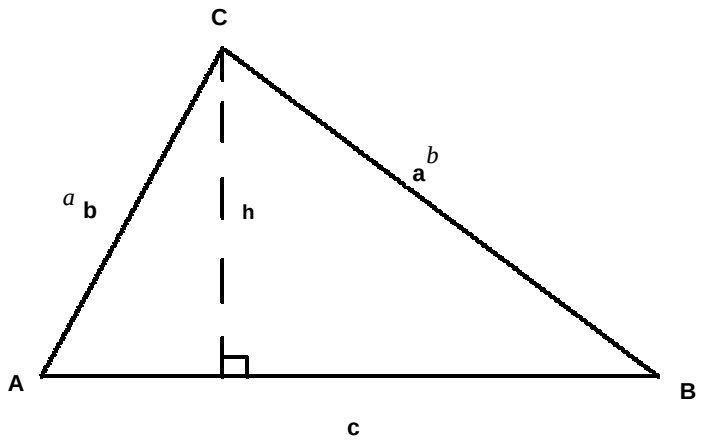
5.1 In ? ABC, CD ⊥ AB, $\hat{A} = x$, $\hat{B} = 41^{o}$, AD = 14 units and BD = 15 units.



5.1.1 Calculate the numerical value of *h*, correct to TWO decimal places. (3)

5.1.2 Determine the numerical value of *x*, correct to ONE decimal place. (3)

5.2 In ? ABC, CD ⊥ AB, CD = *h* units, BC = *a* units, and AC = *b* units.



5.2.1 Write down sin A in terms of *h* and *b*. (1)

5.2.2 Write down sin B in terms of *h* and *a*. (1)

5.2.3 Hence, show that $\frac{\sin A}{a} = \frac{\sin B}{b}$ (4)

5.2.4 Use the above result to calculate $\hat{A}$, if *a* = 32 cm, $\hat{B} = 40^o$ en b = 25 cm. (4)
[16]

QUESTION 6

6.1 At a careers information indaba, 120 Grade 10 learners were asked what they intended doing when they left school.

The following results were recorded:

40 learners wanted to go to university
36 learners wanted to go to technikon
30 learners wanted to start working
14 learners did not know what they wanted to do

Illustrate the above information on a pie chart. Show ALL calculations. (6)

6.2 Fifteen students were selected to write a Mathematics Olympiad examination. The time (in minutes) that each student took to complete the paper, was recorded as follows:

Student	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P
Time (in minutes)	25	30	27	32	26	25	31	29	25	32	27	25	33	28	25

6.2.1 Calculate the mean time. (2)

6.2.2 Write down the median and the mode. (3)

6.2.3 Calculate the inter-quartile range. (5)

6.3 The following is a list of temperatures (ºC) in Durban for the first two weeks during February 2006:

25; 29; 36; 26; 28; 35; 30; 38; 27; 39; 27; 40; 41; 43

6.3.1 Use the above data to complete the frequency table below.
(See diagram sheet)

Temperature in ^{o}C (T)	**Frequency**
$25 \leq T < 30$	
$30 \leq T < 35$	
$35 \leq T < 40$	
$40 \leq T < 45$	

(4)

6.3.2 Draw a histogram to represent the distribution of the temperatures. (4)

6.3.3 How would you describe the distribution of temperatures in the histogram? (2)

[26]

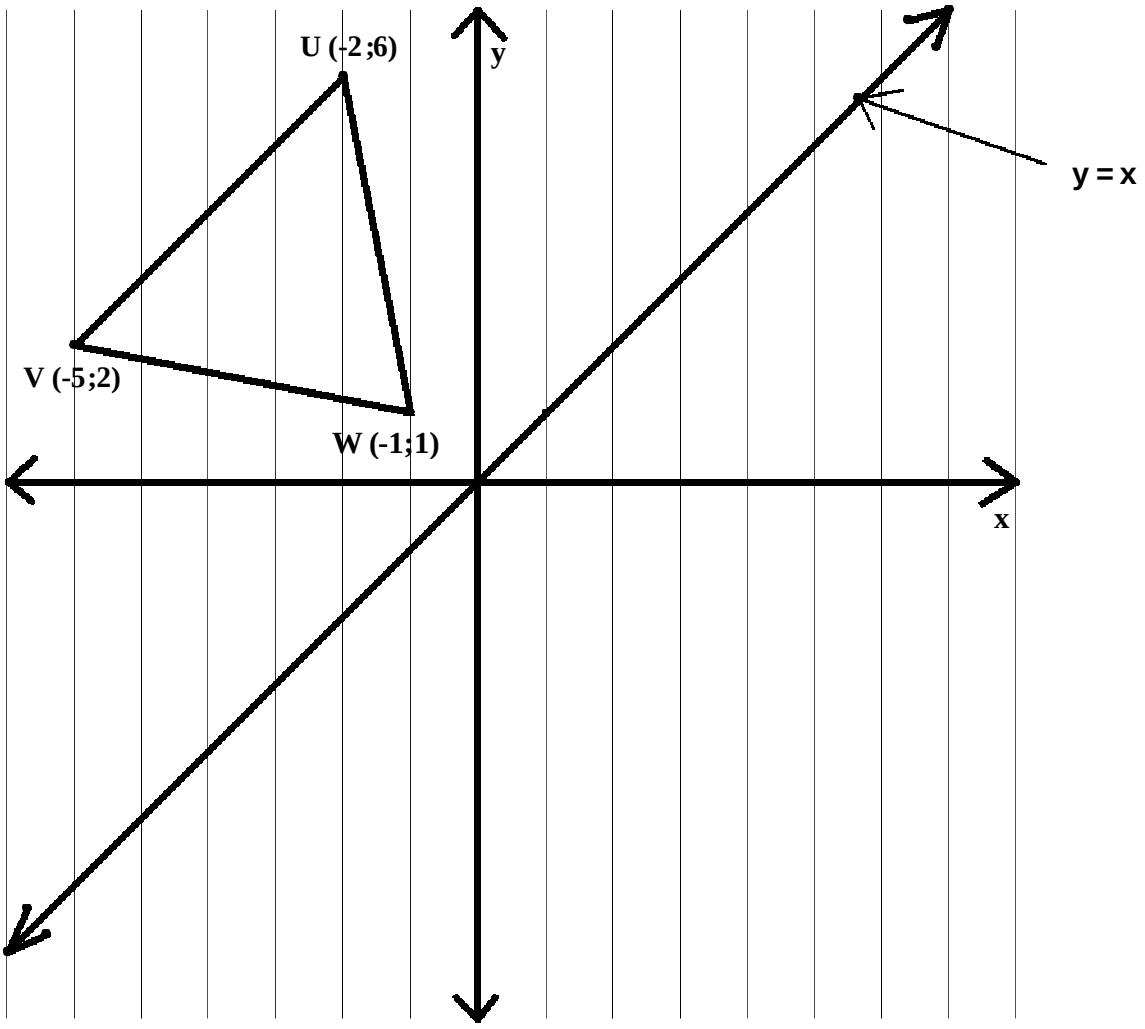
TOTAL: 100

DIAGRAM SHEET – MATHEMATICS E PAPER 2

DIAGRAMVEL – WISKUNDE VRAESTEL 2

NAME / NAAM:……

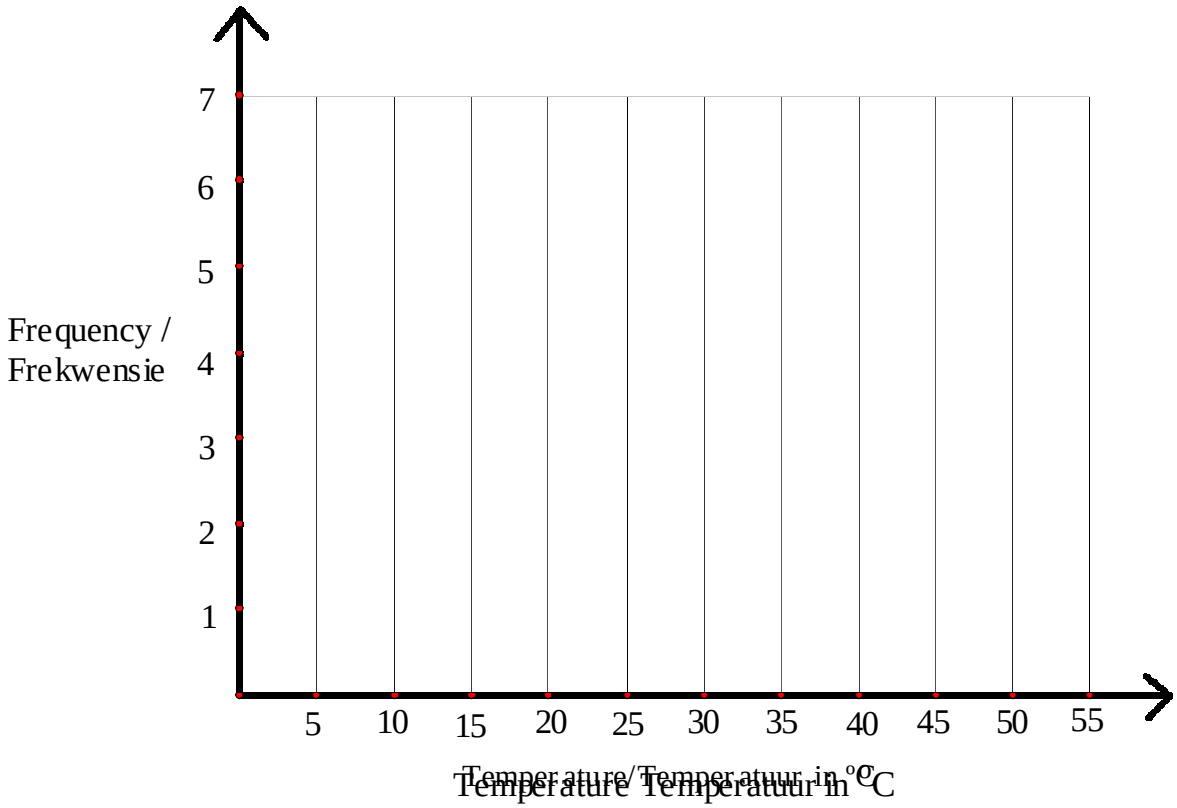
3.3



6.3.1

Temperature in ^{o}C/ Temperatuur in ^{o}C (T)	Frequency/Frekwensie
$25 \leq T < 30$	
$30 \leq T < 35$	
$35 \leq T < 40$	
$40 \leq T < 45$	

6.3.2



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NASIONALE SENIOR SERTIFIKAAT

GRAAD 10

WISKUNDE V2

MODELVRAESTEL

PUNTE: 100

TYD: 2 uur

Hierdie vraestel bestaan uit 9 bladsye en 2 diagramvelle.

Grafiekpapier moet aan die kandidate voorsien word.

153 2 A

INSTRUKSIES EN INLIGTING

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

1. Hierdie vraestel bestaan uit SES vrae. Beantwoord AL die vrae.

2. Wys duidelik ALLE berekeninge, diagramme, grafieke, ensovoorts wat jy tydens die beantwoording van die vrae gebruik het.

3. 'n Goedgekeurde (nie-programmeerbare en nie-grafiese) sakrekenaar mag gebruik word, tensy anders vermeld.

4. Indien nodig, rond antwoorde tot TWEE desimale syfers af, tensy anders gevra.

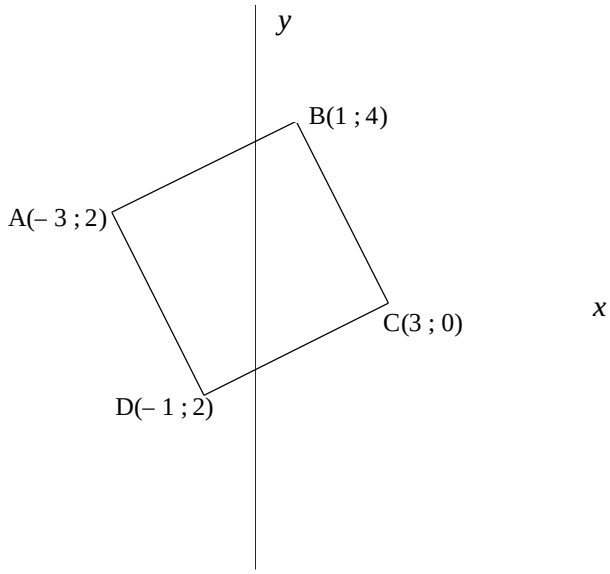
5. Nommer die antwoorde PRESIES soos die vrae genommer is.

6. Diagramme is NIE noodwendig volgens skaal geteken nie.

7. Dit is in jou eie belang om netjies en leesbaar te skryf.

VRAAG 1

Gegee punte A (-3;2), B (1;4), C (3;0) en D (-1;-2) in 'n Kartesiese vlak, beantwoord die volgende vrae:



1.1 Bereken die volgende:

1.1.1 Die gradiënte van AB en DC (5)

1.1.2 Die lengtes van AB en DC (5)

1.1.3 Die gradiënte van AC en BD (4)

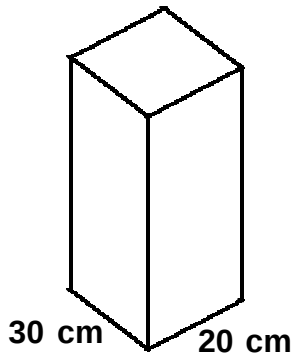
1.2 Watter spesiale vorm word deur die vierhoek ABCD voorgestel? Gee 'n rede vir jou antwoord. (3)

[17]

VRAAG 2

2.1 'n Werktuigkundige gebruik 36 000 cm^3 olie om 'n tenk, in die vorm van 'n reghoekige prisma, vol te maak. Die afmetings van die basis van die tenk is 30 cm by 20 cm.

Bereken die hoogte van die tenk.



(4)

2.2 Met hoeveel sal die volume van die tenk vermeerder as die lengte en breedte van die tenk verdubbel word en die hoogte dieselfde bly? Wat is die nuwe volume? (4)
[8]

VRAAG 3

3.1 Gebruik die grafiekpapier verskaf en teken die pentagoon met hoekpunte wat deur die volgende koördinate voorgestel word:

P (-1 ; 5), Q (4 ; 3), R (2 ; -2), S (-2 ; -3) en T (-4 ; 1)

Konstrueer, op dieselfde assestelsel, die pentagoon wat gevorm deur deur die pentagoon PQRST 2 eenhede afwaarts en 3 eenhede na regs te skuif. Dui die koördinate van die hoekpunte aan. (10)

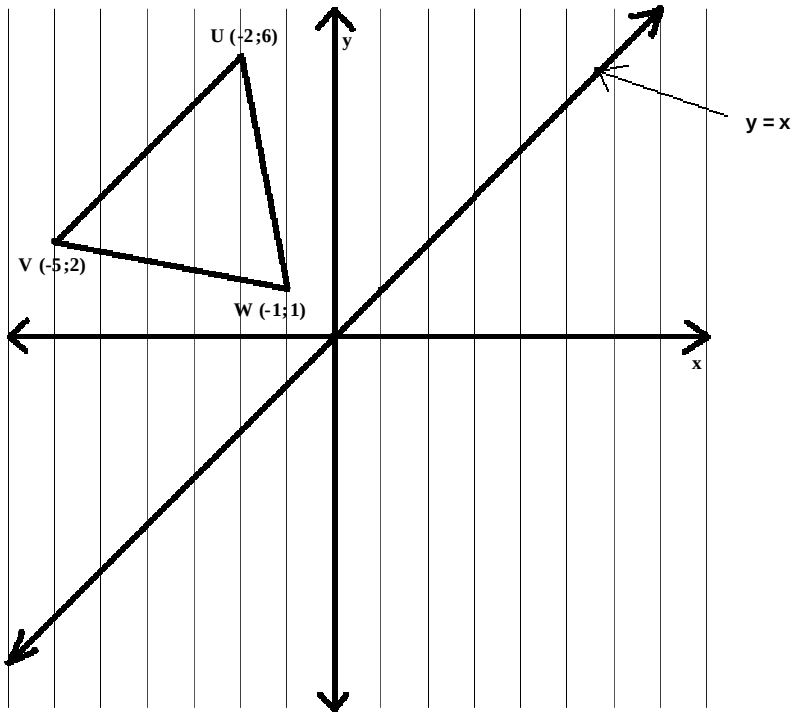
3.2 A (0 ; 4), B (-4 ; 0), C (-1 ; -1) en D (3 ; 3) is die koördinate van die hoekpunte van 'n parallelogram ABCD in 'n Kartesiese vlak.

3.2.1 Wys dat die koördinate van E, die snypunt van die diagonale van parallelogram ABCD, $\left(-\frac{1}{2}\ ;\ \frac{3}{2}\right)$ is. (3)

3.2.2 As ABCD sodanig geskuif word dat die koördinate van E nou verander na $\begin{pmatrix} 5 \\ ; \\ \end{pmatrix}\begin{matrix} 3 \\ 2 \end{matrix}$, beskryf die verskuiwing van die parallelogram. (2)

3.2.3 Beskryf die nuwe koördinate van $A^{/}$ en $C^{/}$. (4)

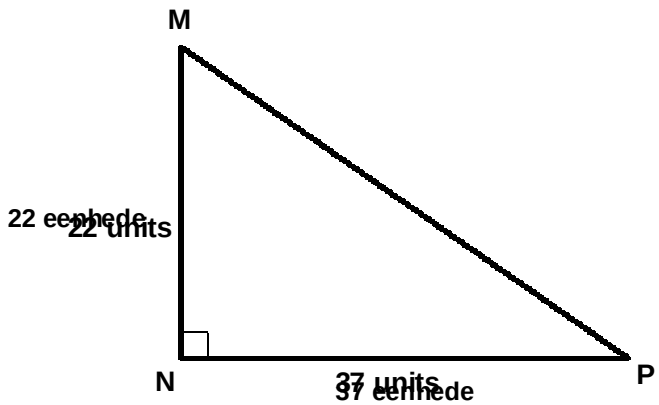
3.3 In die diagram hieronder het Δ UVW koördinate U (-2 ; 6), V (-5 ; 2) en W (-1 ; 1). As Δ UVW gereflekteer word in die lyn $y = x$, teken Δ $U'V'W'$ (op die rooster voorsien) en skryf die koördinate van U', V' en W' neer.



(6)
[25]

VRAAG 4

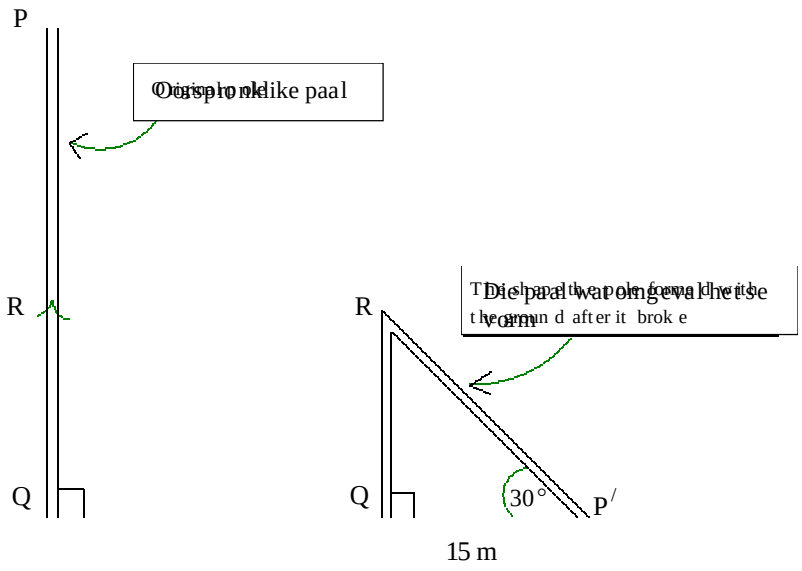
4.1 In ? MNP, MN = 22 eenhede, $\hat{N} = 90^o$ en NP = 37 eenhede. Bepaal $\hat{P}$ (korrek tot EEN desimale plek).



(3)

4.2 'n Paal PQ het by punt R gebreek. Die boonste gedeelte van die paal, PR, breek en val om en vorm 'n hoek van 30º met die grond en P′, die voet van die paal is nou 15 m van Q af.

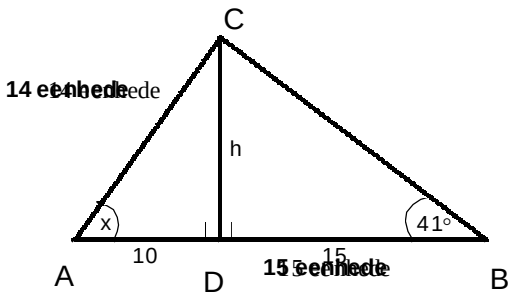
Bereken die oorspronklike hoogte van paal PQ (korrek tot EEN desimale plek).



(5)
[8]

VRAAG 5

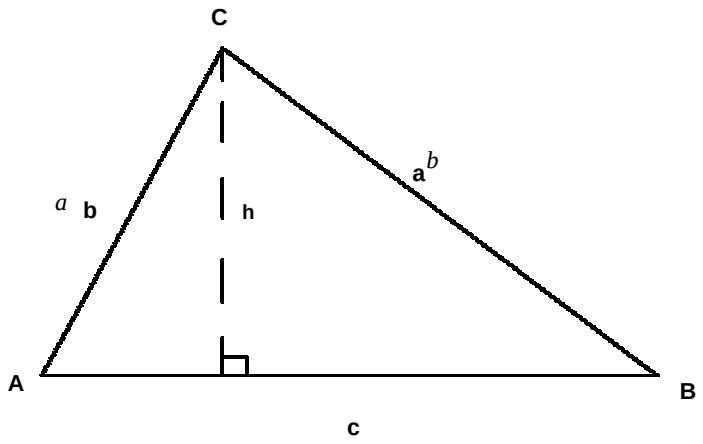
5.1 In ? ABC, CD ⊥ AB, $\hat{A} = x$, $\hat{B} = 41^{o}$, AD = 14 eenhede en BD = 15 eenhede.



5.1.1 Bereken die numeriese waarde van *h*, korrek tot TWEE desimale plekke. (3)

5.1.2 Bereken die numeriese waarde *x*, korrek tot EEN desimale plek. (3)

5.2 In ? ABC, CD ⊥ AB, CD = *h* eenhede, BC = *a* eenhede, en AC = *b* eenhede.



5.2.1 Skryf sin A in terme van *h* en *b*. (1)

5.2.2 Skryf sin B in terme van *h* en *a*. (1)

5.2.3 Vervolgens, toon dat $\frac{\sin A}{a} = \frac{\sin B}{b}$ (4)

5.2.4 Gebruik bostaande resultate om die waarde van $\hat{A}$ te bepaal, as *a* = 32 cm, $\hat{B} = 40^o$ en *b* = 25 cm. (4)
[16]

VRAAG 6

6.1 By 'n beroepsvoorligtingindaba, is 120 Graad 10-leerlinge gevra wat hulle wil doen na skool.

Die volgende resultate is aangeteken:

40 leerlinge wil universiteit toe gaan
36 leerlinge wil technikon toe gaan
30 leerlinge wil gaan werk
14 leerlinge weet nog nie wat hulle wil gaan doen nie

Stel die inligting op 'n sirkeldiagram voor. Toon AL die berekeninge. (6)

6.2 Vyftien leerlinge is gekies om 'n Wiskunde-olimpiade-eksamen te skryf. Die tyd (in minute) wat elke leerling benodig het om die vraestel te voltooi, is soos volg aangeteken:

Leerling	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P
Tyd (in minute)	25	30	27	32	26	25	31	29	25	32	27	25	33	28	25

6.2.1 Bereken die gemiddelde tyd gebruik. (2)

6.2.2 Gee die mediaan en modus. (3)

6.2.3 Bereken die interkwartiel-omvang. (5)

6.3 Die volgende lys temperature (ºC) in Durban is aangeteken vir die eerste twee weke gedurende Februarie 2006:

25; 29; 36; 26; 28; 35; 30; 38; 27; 39; 27; 40; 41; 43

6.3.1 Gebruik die bostaande data om die frekwensietabel hieronder in te vul. (Sien diagramvel)

Temperatuur in ^{o}C (T)	**Frekwensie**
$25 \leq T < 30$	
$30 \leq T < 35$	
$35 \leq T < 40$	
$40 \leq T < 45$	

(4)

6.3.2 Teken 'n histogram om die verspreiding van die temperature voor te stel. (4)

6.3.3 Hoe sal jy die verspreiding van die temperatuur in die histogram beskryf? (2)
[26]

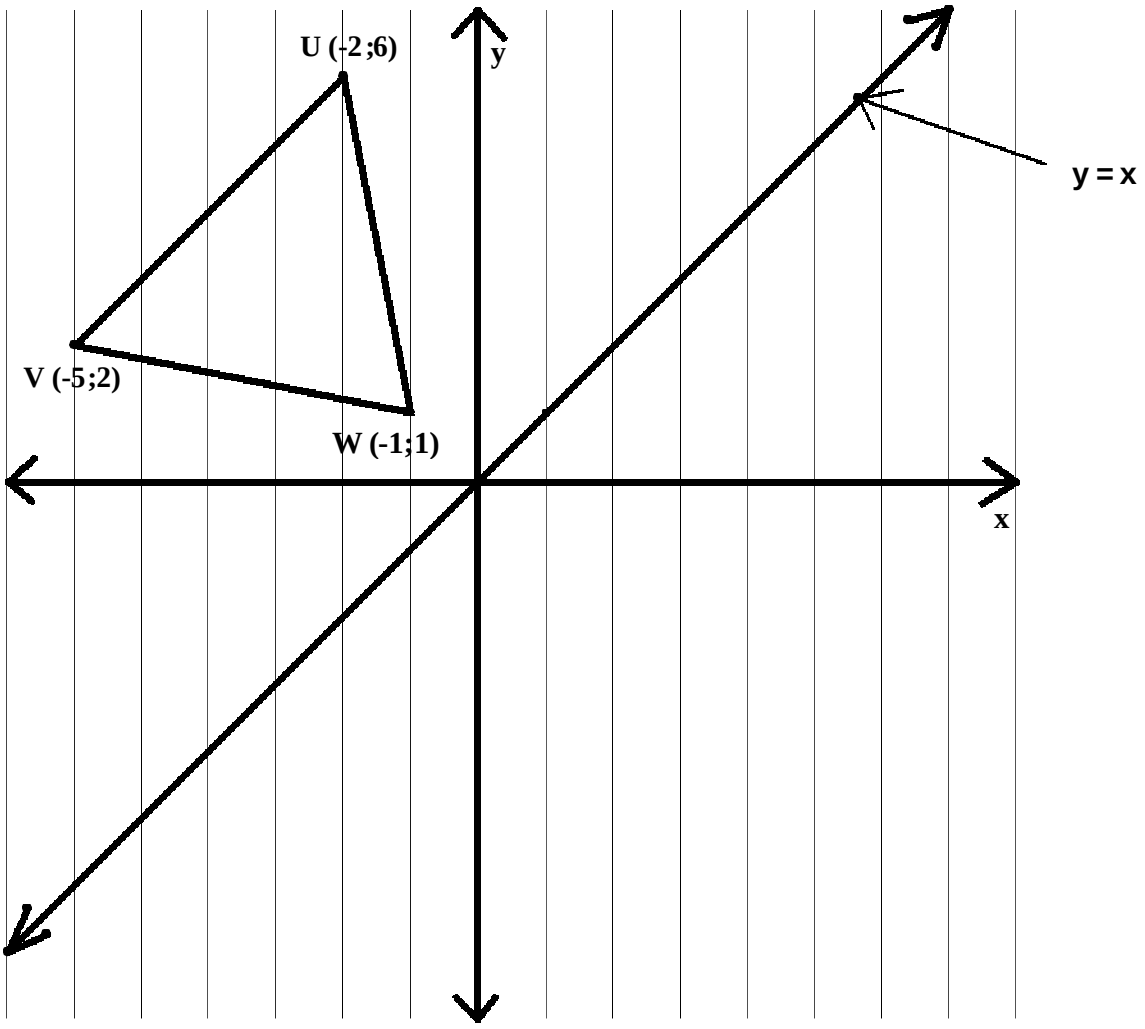
TOTAAL: 100

DIAGRAMVEL – WISKUNDE VRAESTEL 2

DIAGRAM SHEET – WISKUNDE VRAESTEL 2

NAAM / NAME:……

3.3



6.3.1

Temperature in ^{o}C/ Temperatuur in ^{o}C (T)	Frequency/Frekwensie
$25 \leq T < 30$	
$30 \leq T < 35$	
$35 \leq T < 40$	
$40 \leq T < 45$	

6.3.2