

**SENIOR CERTIFICATE
EXAMINATION
SENIORSERTIFIKAAT-EKSAMEN**



**FEBRUARY / FEBRUARIE
MARCH / MAART**

2005

FUNCTIONAL MATHEMATICS

***FUNKSIONELE
WISKUNDE***

**(Second Paper)
(Tweede Vraestel)**

SG

303-2/2

FUNCTIONAL MATHEMATICS SG: Paper 2

22 pages

22 bladsye



X05



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GAUTENGSE DEPARTEMENT VAN ONDERWYS

SENIORSERTIFIKAAT-EKSAMEN

FUNKSIONELE WISKUNDE SG
(Tweede Vraestel: Meetkunde)

TYD: 3 uur

PUNTE: 150

INSTRUKSIES:

- Afdelings A en B is VERPLIGTEND.
 - Beantwoord enige TWEE van die volgende Afdelings: C, D, E of F.
 - Nie-programmeerbare sakrekenaars mag gebruik word. As die vraag dit nie spesifiseer nie, dan moet die finale antwoord afgerond word tot TWEE desimale syfers.
 - Alle toepaslike berekeninge moet getoon word.
 - Geen antwoorde mag deur konstruksie en meting bepaal word nie.
 - 'n Formuleblad en grafiekpapier word voorsien.
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GAUTENG DEPARTMENT OF EDUCATION

SENIOR CERTIFICATE EXAMINATION

FUNCTIONAL MATHEMATICS SG
(Second Paper: Geometry)

TIME: 3 hours

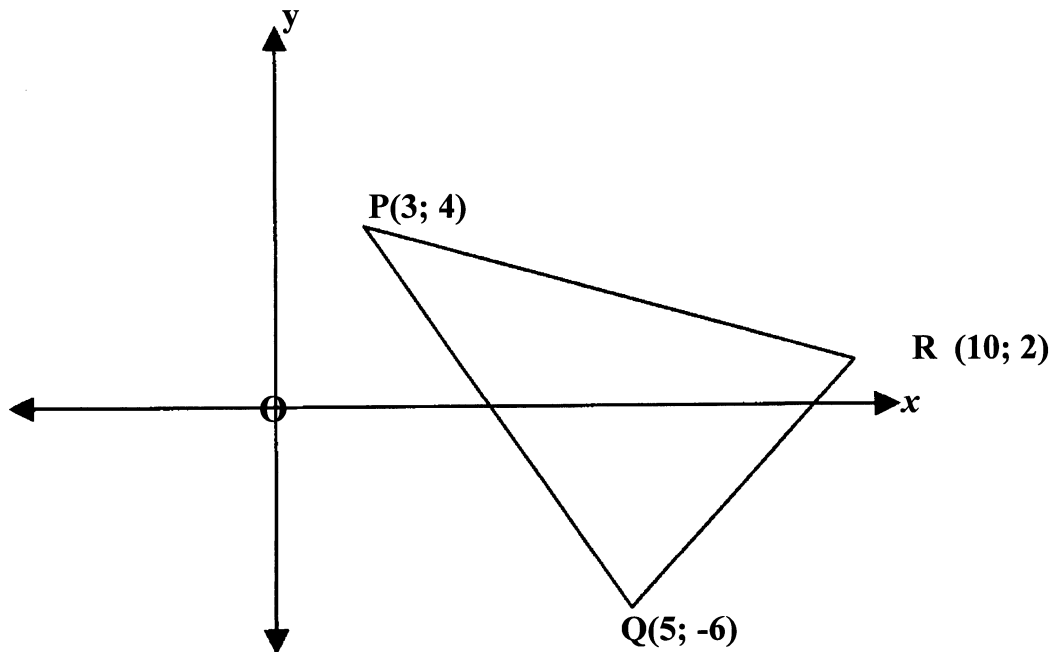
MARKS: 150

INSTRUCTIONS:

- Sections A and B are **COMPULSORY**.
 - Answer any **TWO** of the following Sections: C, D, E or F.
 - Non-programmable calculators may be used. If the question does not specify, then the final answer must be rounded off to **TWO** decimal digits.
 - All appropriate calculations must be shown.
 - No answers may be determined by construction and measurement.
 - An information sheet **and** graph paper have been provided.
-
-

AFDELING A
KOÖRDINAATMEETKUNDE
VERPLIGTEND

VRAAG 1



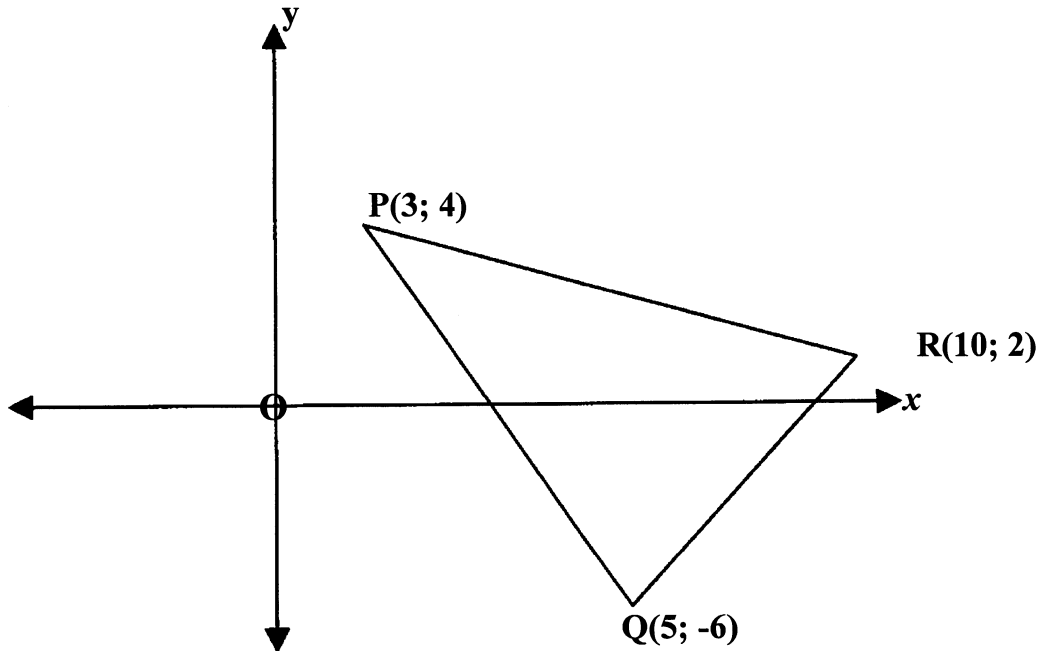
$P(3; 4)$, $Q(5; -6)$ en $R(10; 2)$ is die hoekpunte van $\triangle PQR$.

- 1.1 Bereken die lengte van **PR**. Laat jou antwoord in wortelvorm. (5)
- 1.2 Bereken die gradiënt van die lyn **RQ**. (3)
- 1.3 As $\tan\theta = m_{RQ}$, bereken die inklinasie van **RQ**, afgerond tot die naaste heelgetal. (2)
- 1.4 Bereken die vergelyking van die reguit lyn deur die punte **P** en **Q**, in die vorm $y = \dots$ (5)

[15]

SECTION A
CO-ORDINATE GEOMETRY
COMPULSORY

QUESTION 1

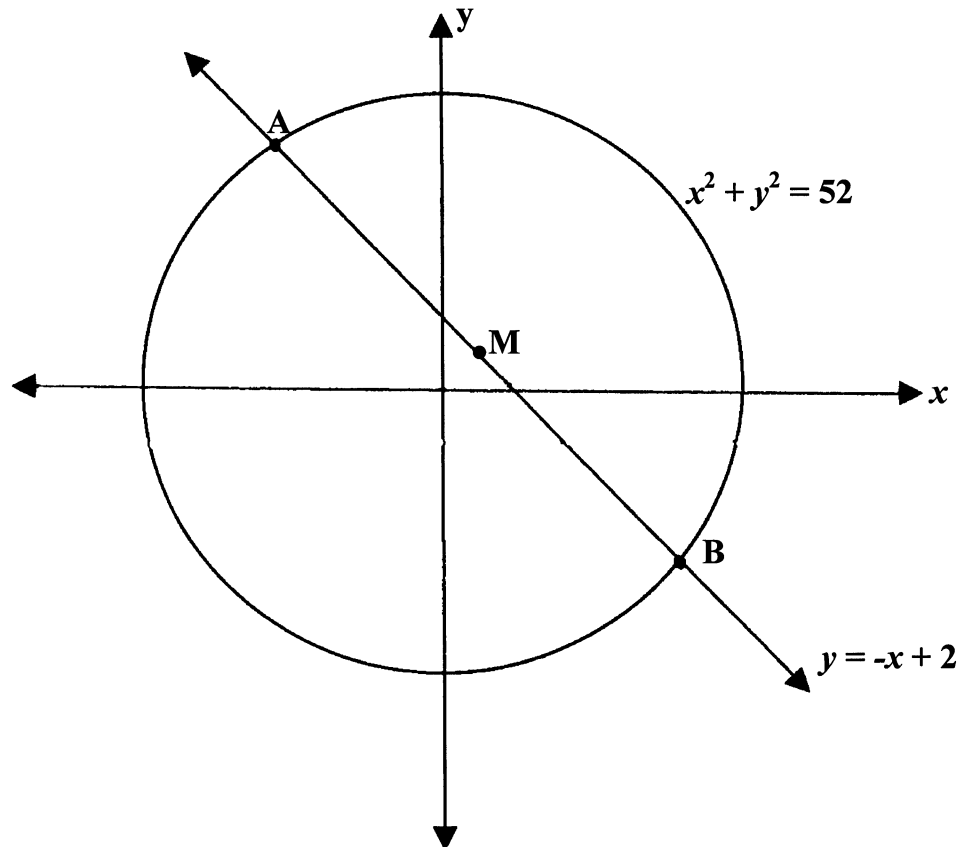


P(3; 4), Q(5; -6) and R(10; 2) are vertices of ΔPQR .

- 1.1 Calculate the length of **PR**. Leave your answer in surd form. (5)
- 1.2 Calculate the gradient of line **RQ**. (3)
- 1.3 If $\tan\theta = m_{RQ}$ calculate the inclination of **RQ**, rounded off to the nearest integer. (2)
- 1.4 Calculate the equation of the straight line passing through points **P** and **Q**, in the form $y = \dots$ (5)

[15]

VRAAG 2

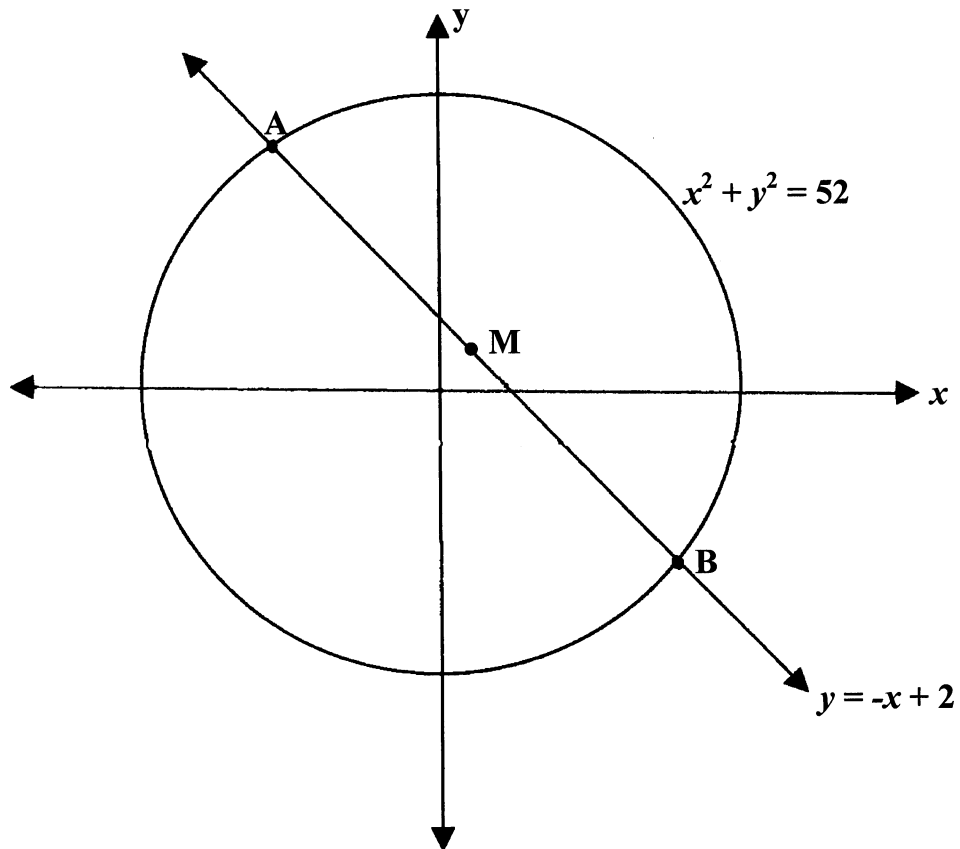


'n Reguit lyn, waarvan die vergelyking $y = -x + 2$ is, sny die sirkel $x^2 + y^2 = 52$ by die punte **A** en **B**.

- 2.1 Bepaal die koördinate van **A** en **B**. (8)
- 2.2 Bepaal die koördinate van **M**, die middelpunt van AB as $A(-4; 6)$ en $B(6; -4)$. (3)
- 2.3 Bepaal die x- en y-afsnitte van die reguit lyn $y = -x + 2$. (4)

[15]

QUESTION 2



A straight line whose equation is $y = -x + 2$ cuts the circle $x^2 + y^2 = 52$ at points A and B.

- 2.1 Determine the co-ordinates of A and B. (8)
- 2.2 Determine the co-ordinates of M, the midpoint of AB, if A is the point (-4; 6) and B(6; -4). (3)
- 2.3 Determine the x- and y-intercepts of the straight line $y = -x + 2$. (4)

[15]

VRAAG 3

Gegee: $4y + 2x = 8$.

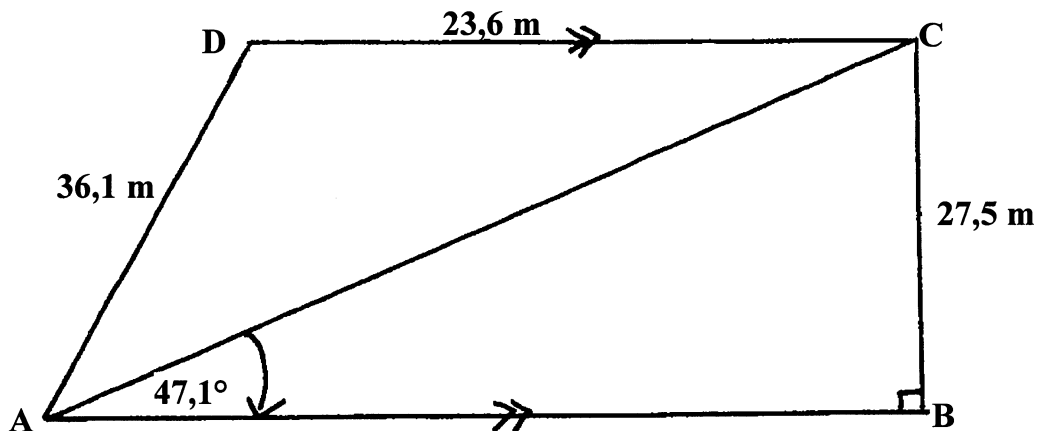
- 3.1 Skryf die vergelyking in die vorm $y = mx + c$. (2)
- 3.2 Skryf die gradiënt neer van enige ander lyn wat ewewydig is aan $4y + 2x = 8$. (1)
- 3.3 Bepaal die vergelyking van die reguit lyn wat loodreg is op $4y + 2x = 8$ en deur die punt $(2; -3)$ gaan. (5)

[8]

TOTAAL VIR AFDELING A: [38]

AFDELING B
TRIGONOMETRIE
VERPLIGTEND

VRAAG 4



ABCD is 'n erf waarvan $BC = 27,5$ m, $CD = 23,6$ m, $AD = 36,1$ m, $\hat{ABC} = 90^\circ$ en $\hat{CAB} = 47,1^\circ$.

- 4.1 Bewys dat die lengte van $AC = 37,5$ m. (4)
- 4.2 Bereken \hat{ACD} . (2)
- 4.3 Bereken \hat{D} . (5)
- 4.4 Bereken die oppervlakte van $\triangle ACD$ met **Oppervlakte** = $\frac{1}{2} \dots \text{Sin}C$. (3)

[14]

QUESTION 3

Given: $4y + 2x = 8$.

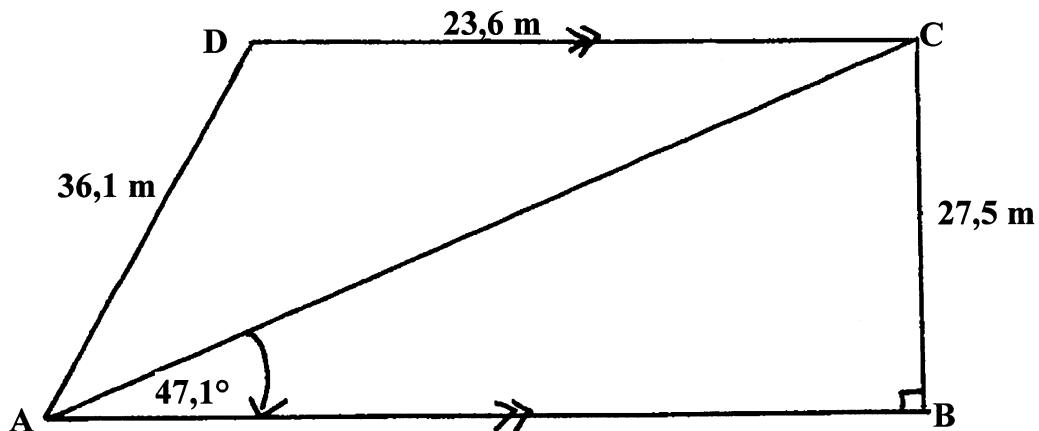
- 3.1 Write the equation in the form $y = mx + c$. (2)
- 3.2 Write down the gradient of any other line parallel to $4y + 2x = 8$. (1)
- 3.3 Determine the equation of the straight line perpendicular to $4y + 2x = 8$ and passing through the point $(2; -3)$. (5)

[8]

TOTAL FOR SECTION A: [38]

SECTION B TRIGONOMETRY COMPULSORY

QUESTION 4



ABCD is a stand. $BC = 27,5$ m, $CD = 23,6$ m, $AD = 36,1$ m, $\hat{A}BC = 90^\circ$ and $\hat{C}AB = 47,1^\circ$.

- 4.1 Prove the length of $AC = 37,5$ m. (4)
- 4.2 Calculate $\hat{A}CD$. (2)
- 4.3 Calculate \hat{D} . (5)
- 4.4 Calculate the area of $\triangle ACD$ with $\text{Area} = \frac{1}{2} \dots \text{Sin}C$. (3)

[14]

VRAAG 5

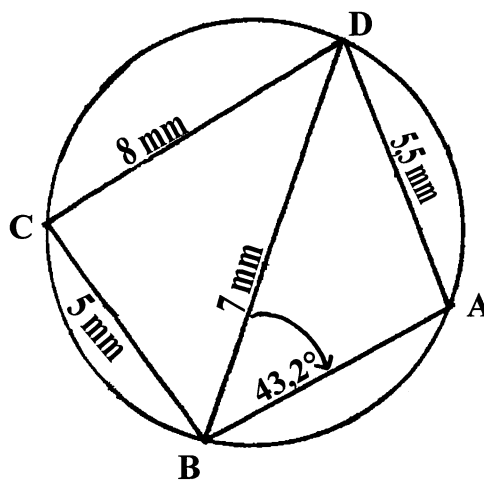
5.1 Voltooi volgens ΔPQR

5.1.1 Kosinus reël $q^2 = \dots$ (2)

5.1.2 Oppervlakte $\Delta PQR = \dots R$ (2)

5.1.3 $\frac{q}{\dots} = \frac{\dots \times \dots}{\sin R}$ (2)

5.2



In die figuur hierbo is $\hat{DBA} = 43,2^\circ$, $DC = 8$ mm, $BC = 5$ mm, $BD = 7$ mm en $AD = 5,5$ mm. Toon deur berekening aan:

5.2.1 $\hat{C} = 60^\circ$ (6)

5.2.2 $\hat{BAD} = 60,6^\circ$ (5)

[17]

QUESTION 5

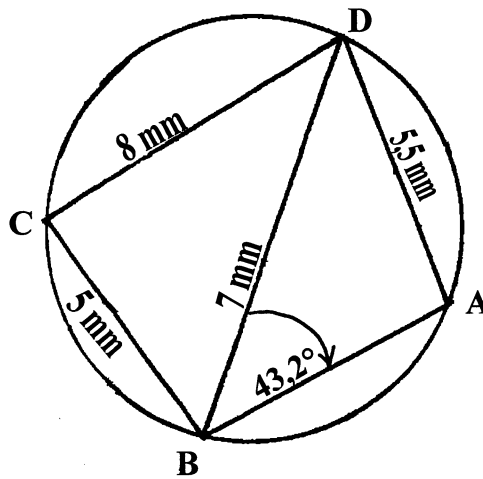
5.1 Complete according to ΔPQR

5.1.1 Cosine rule $q^2 = \dots$ (2)

5.1.2 Area of $\Delta PQR = \dots R$ (2)

5.1.3 $\frac{q}{\dots} = \frac{\dots \times \dots}{\sin R}$ (2)

5.2



In the above figure, $\hat{DBA} = 43,2^\circ$, $DC = 8$ mm, $BC = 5$ mm, $BD = 7$ mm and $AD = 5,5$ mm. Prove through calculation:

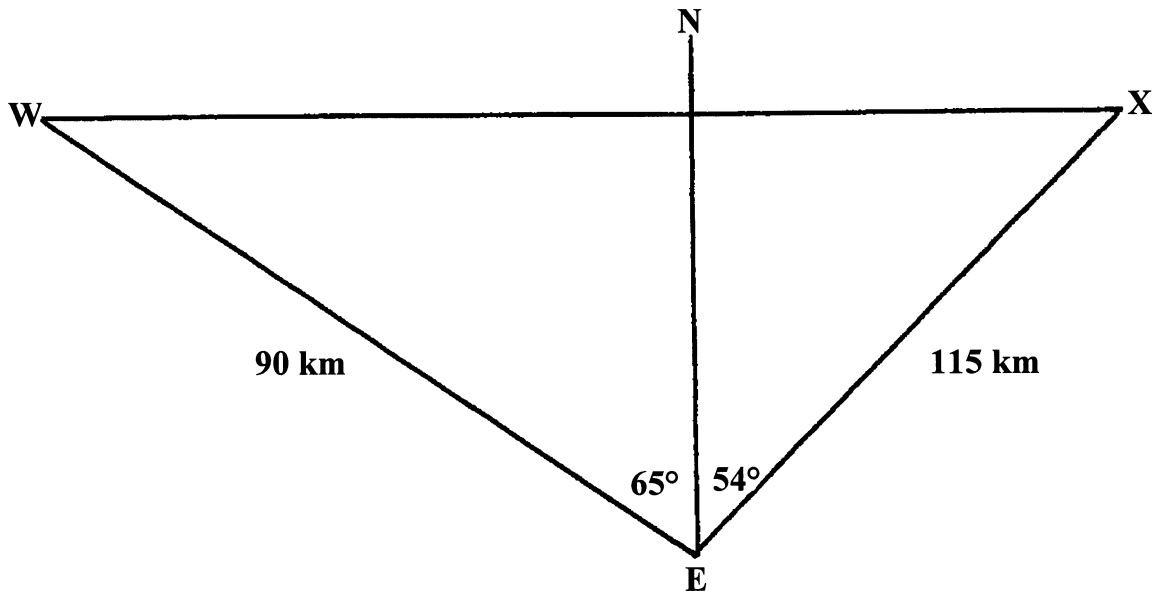
5.2.1 $\hat{C} = 60^\circ$ (6)

5.2.2 $\hat{BAD} = 60,6^\circ$ (5)

[17]

VRAAG 6

'n Fietsryer W verlaat punt E om 07:00 en ry teen 'n gemiddelde spoed van 15 km/u in die rigting 65° wes van Noord. Fietsryer X verlaat punt E om 08:00 en ry teen 'n gemiddelde spoed van 23 km/u in rigting 54° oos van Noord.



Bereken die afstand tussen W en X om 13:00 op dieselfde dag. (Gebruik Kosinusreël) [7]

TOTAAL VIR AFDELING B: [38]

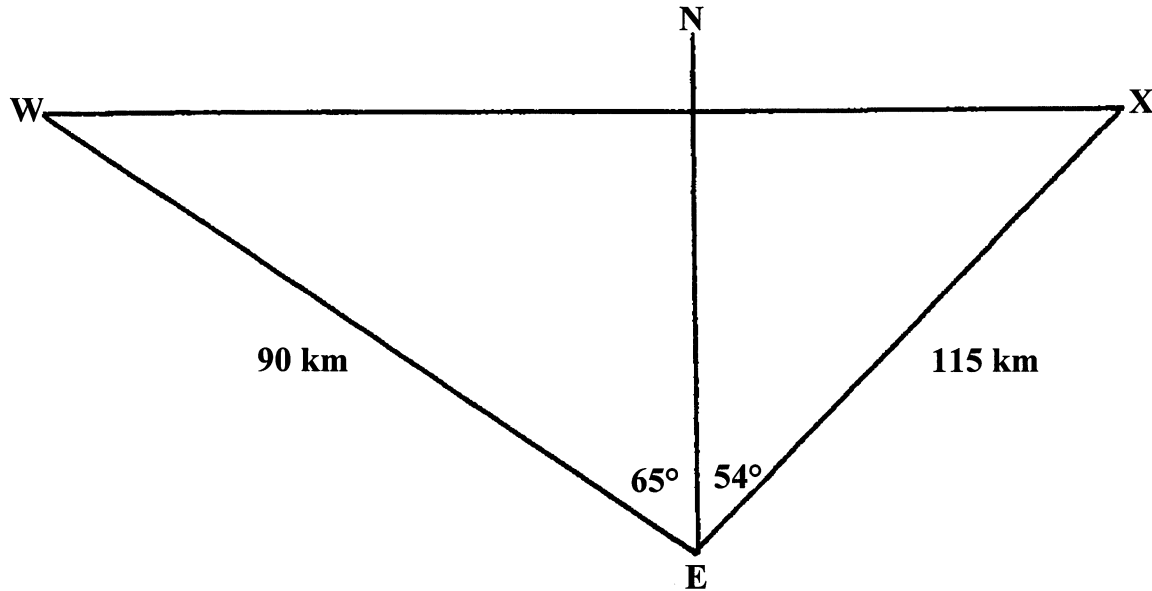
AFDELING C **VERBRUIKERSWISKUNDE** **OPSIONEEL**

VRAAG 7

Bereken die maandelikse paaiement wat jy sal moet betaal as jy 'n item van R19 000 koop en dit oor 24 maande wil afbetaal. Jy het 'n deposito van R3 800 gegee en die rente betaalbaar oor die res van die bedrag is 10% p.a.enkelvoudige rente. [9]

QUESTION 6

Cyclist W leaves point E at 07:00 and cycles at an average speed of 15 km/h in the direction 65° west of North. Cyclist X leaves point E at 08:00 and cycles at an average speed of 23 km/h in the direction 54° east of North.



Calculate the distance between W and X at 13:00 on the same day. (Use Cosine rule.) [7]

TOTAL FOR SECTION B: [38]

**SECTION C
CONSUMER MATHEMATICS
OPTIONAL**

QUESTION 7

Calculate the monthly instalment you would have to pay over 24 months if you buy an article worth R19 000. You pay a deposit of R3 800 and the interest payable on the difference (balance) of the amount p.a. is 10% simple interest. [9]

VRAAG 8

Belastingkoers vir die jaarlikse aanslag

GETROUDE PERSONE			
Belasbare inkomste		Belastingkoers	
R	0 - 5 000	17% van elke R1	
R	5 000 - 10 000	R 850 + 18%	van die bedrag bo R 5 000
R	10 000 - 15 000	R 1 750 + 19%	van die bedrag bo R 10 000
R	15 000 - 25 000	R 2 700 + 20%	van die bedrag bo R 15 000
R	25 000 - 30 000	R 3 700 + 21%	van die bedrag bo R 25 000
R	30 000 - 40 000	R 5 800 + 28%	van die bedrag bo R 30 000
R	40 000 - 50 000	R 8 600 + 36%	van die bedrag bo R 40 000
R	50 000 - 60 000	R 12 200 + 41%	van die bedrag bo R 50 000
R	60 000 - 80 000	R 16 300 + 42%	van die bedrag bo R 60 000
R	80 000 +	R 24 700 + 43%	van die bedrag bo R 80 000

Me. S verdien 'n salaris van R73 420 in 2002. In Januarie 2003 kry sy 'n verhoging van 9,5%. Bereken haar jaarlikse inkomstebelasting vir

8.1 2002 (4)

8.2 2003 (5)
 [9]

VRAAG 9

'n MacDonald's eienaar bepaal sy weeklikse uitgawes aan BTW en belasting op lone vir tydelike werkers.

Vir BTW gebruik hy die volgende tabel:

Bedrag	BTW
R 100	R 14
R 150	R 21
R 200	R 28
R 500	R 70
R1 000	R140
R1 500	R210

Vir die belasting op lone vir tydelike werkers gebruik hy die volgende tabel:

Lone	Belasting
R 350	R 24,50
R 500	R 35,00
R 650	R 45,50
R 800	R 56,00
R 900	R 63,00
R 950	R 66,50

QUESTION 8

Tax rates for the year of assessment

MARRIED PERSONS			
Taxable income		Rates of tax	
R	0 - 5 000	17% of each R1	
R	5 000 - 10 000	R 850 + 18%	of the amount over R 5 000
R	10 000 - 15 000	R 1 750 + 19%	of the amount over R 10 000
R	15 000 - 25 000	R 2 700 + 20%	of the amount over R 15 000
R	25 000 - 30 000	R 3 700 + 21%	of the amount over R 25 000
R	30 000 - 40 000	R 5 800 + 28%	of the amount over R 30 000
R	40 000 - 50 000	R 8 600 + 36%	of the amount over R 40 000
R	50 000 - 60 000	R 12 200 + 41%	of the amount over R 50 000
R	60 000 - 80 000	R 16 300 + 42%	of the amount over R 60 000
R	80 000 +	R 24 700 + 43%	of the amount over R 80 000

Mrs S earns R73 420 in 2002 in salary. In January 2003 she received an increase of 9,5%. Calculate her annual income tax for

- 8.1 2002 (4)
- 8.2 2003 (5)
- [9]

QUESTION 9

A MacDonald's owner determines his weekly payments on VAT and tax on salaries for temporary workers.

For VAT he uses the following table:

Amount	VAT
R 100	R 14
R 150	R 21
R 200	R 28
R 500	R 70
R1 000	R140
R1 500	R210

For tax on salaries for temporary workers he uses the following table:

Salaries	Tax
R 350	R 24,50
R 500	R 35,00
R 650	R 45,50
R 800	R 56,00
R 900	R 63,00
R 950	R 66,50

9.1 Bestudeer die BTW/salaris belastingtabelle en identifiseer die belasting/BTW vir die volgende:

- 9.1.1 J.T. Ndlovu ontvang 'n weeklikse salaris van R500. (1)
- 9.1.2 P. Swanepoel ontvang 'n weeklikse salaris van R650. (1)
- 9.1.3 J. Brown ontvang 'n weeklikse salaris van R900. (1)
- 9.1.4 Aankope by die bakkery se totaal vir die week R500. (1)
- 9.1.5 Aankope by Nampac se totaal vir die week R1 500. (1)

9.2 Bereken die totale uitgawes vir die volgende week. (2)
[7]

VRAAG 10

Joost van der Westhuizen verdien R170 000 as rugbykaptein. Jy is 'n finansiële konsultant en moet aan hom verduidelik hoe om sy geld te belê. Hy beskik oor twee opsies:

- Opsie 1: 18% saamgestelde rente
- Opsie 2: 18% enkelvoudige rente

10.1 Voltooi die volgende tabel vir 'n 5-jaar belegging:

Jaar	1	2	3	4	5
Rente op opsie 1	30 600	66 708			
Rente op opsie 2	30 600	61 200			

(3)

10.2 Stel die tabel (opsie 1 en opsie 2) grafies voor op dieselfde assestelsel. (Gebruik die grafiekpapier op bl. 20.) (4)

10.3 Watter opsie sal die beste belegging wees? (1)

10.4 Gebruik die grafiek om die rente verdien na 4 jaar te bepaal.

10.4.1 op opsie 2 (2)

10.4.2 op opsie 1 (2)

[12]

TOTAAL VIR AFDELING C: [37]

- 9.1 Study the VAT/ salaries tax tables and identify the tax/VAT for the following:
- 9.1.1 J.T. Ndlovu receives a weekly salary of R500. (1)
- 9.1.2 P. Swanepoel receives a weekly salary of R650. (1)
- 9.1.3 J. Brown receives a weekly salary of R900. (1)
- 9.1.4 Products bought from the bakery totalling R500. (1)
- 9.1.5 Products bought from Nampac totalling R1 500. (1)
- 9.2 Calculate the total payment for the following week. (2)
- [7]**

QUESTION 10

Joost van der Westhuizen earns R170 000 as rugby captain. You are a financial consultant and must explain to him how to invest his earnings. He has a choice of two options:

- Option 1: 18% compound interest
- Option 2: 18% simple interest

10.1 Complete the table for an investment over 5 years:

Years	1	2	3	4	5
Interest on option 1	30 600	66 708			
Interest on option 2	30 600	61 200			

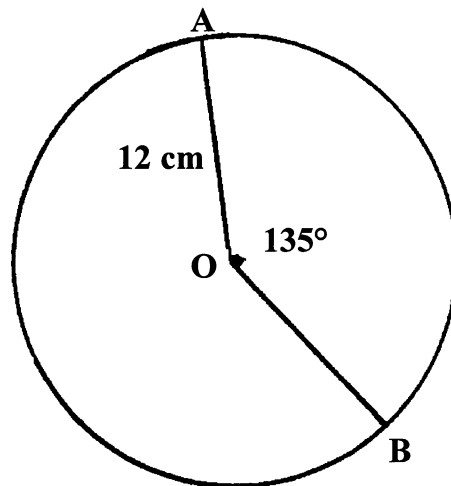
(3)

- 10.2 Represent the table graphically (option 1 and option 2) on the same set of axes. Use the graph paper provided on p 20. (4)
- 10.3 Which option would be the best investment? (1)
- 10.4 Use the graphs to determine the interest earned over 4 years.
- 10.4.1 on option 2 (2)
- 10.4.2 on option 1 (2)
- [12]**

TOTAL FOR SECTION C: [37]

AFDELING D
BOOGMAAT
OPSIONEEL

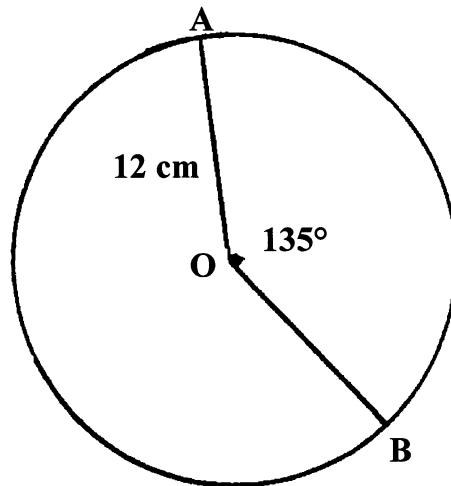
VRAAG 11



- 11.1 In die skets hierbo is O die middelpunt van die sirkel met 'n radius van 12 cm. Bereken die lengte van die boog as $\hat{A}OB = 135^\circ$. (4)
- 11.2 Herlei die volgende na radiale:
- 11.2.1 $112,4^\circ$ (2)
- 11.2.2 270° uitgedruk in terme π (Sakrekenaar mag **nie** gebruik word nie) (2)
- 11.3 Herlei die volgende na grade:
- 11.3.1 4,1 rad (2)
- 11.3.2 $6\sqrt{3}$ rad (Sakrekenaar mag **nie** gebruik word nie) (3)
- [13]

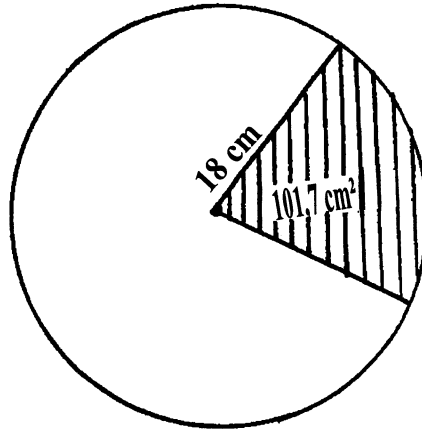
SECTION D
CIRCLE MEASUREMENT
OPTIONAL

QUESTION 11



- 11.1 In the above sketch O is the midpoint of the circle with radius 12 cm. Calculate the length of the arc if $\hat{AOB} = 135^\circ$. (4)
- 11.2 Reduce the following to radians:
- 11.2.1 $112,4^\circ$ (2)
- 11.2.2 270° expressed in terms of π (Calculators may **not** be used) (2)
- 11.3 Reduce the following to degrees:
- 11.3.1 $4,1$ rad (2)
- 11.3.2 6π rad (Calculators may **not** be used) (3)
- [13]**

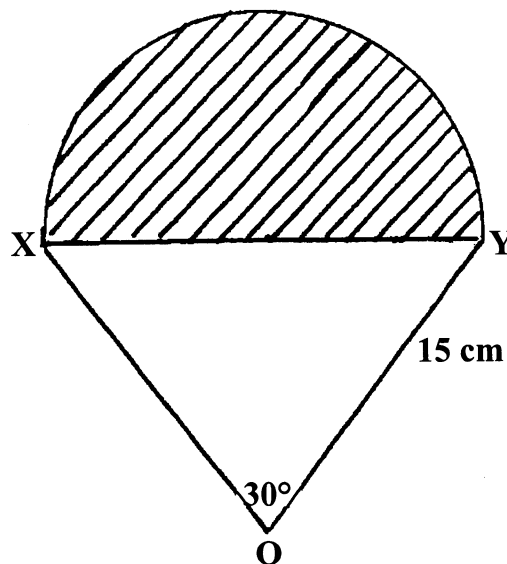
VRAAG 12



In die figuur hierbo, is die radius 18 cm en die oppervlakte van die gearseerde sektor is 101,7 cm². Gebruik die formule **oppervlakte sektor** = $\frac{1}{2}r^2\theta$ en bereken die grootte van die hoek in grade.

(6)
[6]

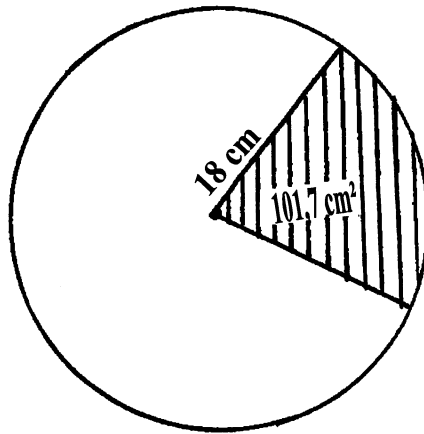
VRAAG 13



Die figuur hierbo toon 'n sektor van 'n sirkel met 'n radius van 15 cm met $X\hat{O}Y = 30^\circ$. Gebruik die formule **oppervlakte** = $\frac{1}{2}r^2(\theta - \sin\theta)$ en bereken die oppervlakte van die segment.

(6)
[6]

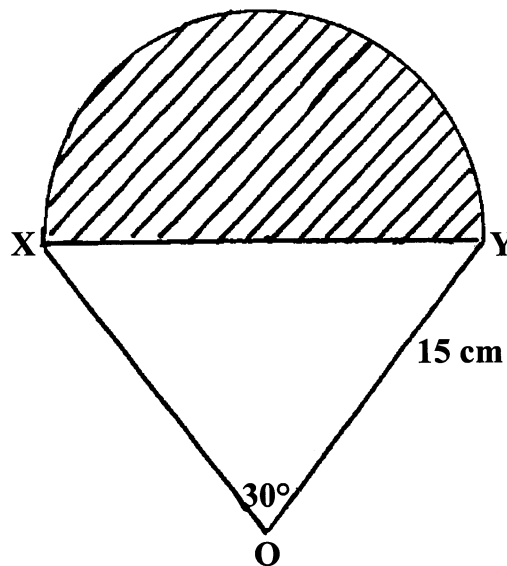
QUESTION 12



In the above figure the radius is 18 cm and the shaded area of the sector is 101,7 cm². Use the formula **area sector** = $\frac{1}{2}r^2\theta$ and calculate the size of the angle in degrees.

(6)
[6]

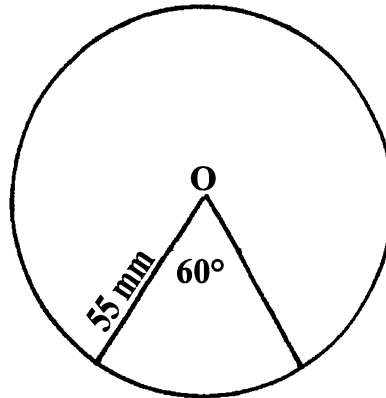
QUESTION 13



The above figure indicates a sector of a circle with radius 15 cm with $\widehat{XOY} = 30^\circ$. Use the formula **area** = $\frac{1}{2}r^2(\theta - \sin\theta)$ and calculate the area of the segment.

(6)
[6]

VRAAG 14



Die figuur toon 'n sirkel met boog wat 'n hoek van 60° by middelpunt O onderspan. As die radius 55 mm is, bereken die

- 14.1 hoek in radiale. (2)
- 14.2 oppervlakte van die sektor. (4)
- [6]

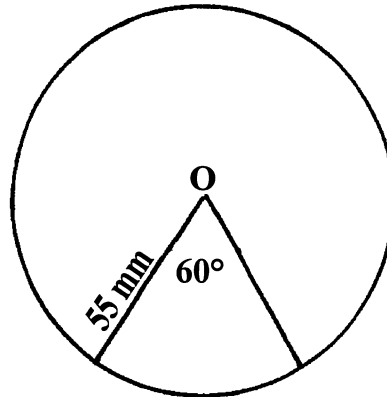
VRAAG 15

Die hoeksnelheid van 'n roterende bandsaag is 219,9 rad /sek.

- 15.1 Gebruik formule $\omega = 2\pi f$ en bereken die aantal omwentelinge per sekonde. (3)
- 15.2 Gebruik formule $V = r\omega$ om die radius te bereken as die snelheid 32 896,7 mm/s is. (3)
- [6]

TOTAAL VIR AFDELING D: [37]

QUESTION 14



The figure indicates a circle with arc with angle 60° at midpoint **O**. If the radius is 55 mm, calculate the

14.1 angle in radians. (2)

14.2 area of the sector. (4)

[6]

QUESTION 15

The angle velocity of a rotated bandsaw is 219,9 rad /sec.

15.1 Use formula $\omega = 2\pi f$ and calculate the number of revolutions per second. (3)

15.2 Use formula $V = r\omega$ to calculate the radius if the speed is 32 896,7 mm/sec. (3)

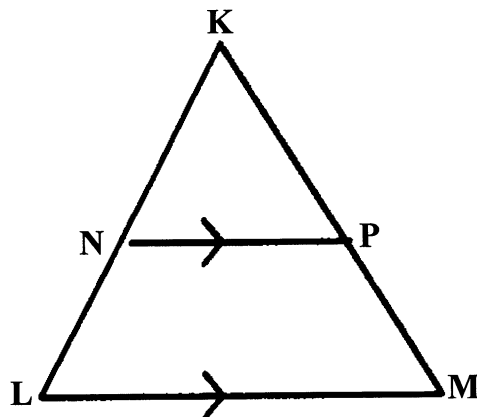
[6]

TOTAL FOR SECTION D: [37]

AFDELING E
VERHOUDING, EWEREDIGHEID EN GELYKVORMIGHEID
OPSIONEEL

VRAAG 16

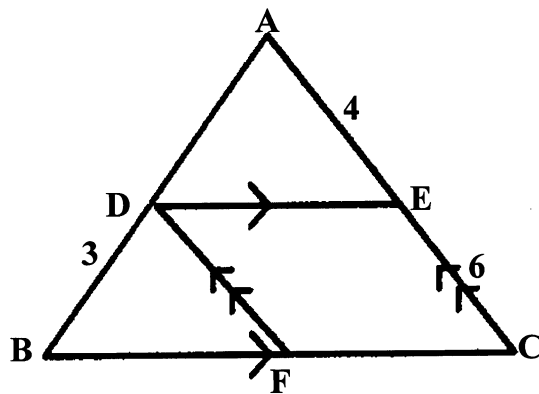
16.1 In die skets: NP//LM.



Skryf een eweredigheid neer wat in die skets sal geld.

(2)

16.2 In $\triangle ABC$: $DE \parallel BC$, $DF \parallel AC$, $AE = 4$ m, $EC = 6$ m en $DB = 3$ m



Bereken die lengtes van

16.2.1 AD

(3)

16.2.2 BF as $FC = 4$ m

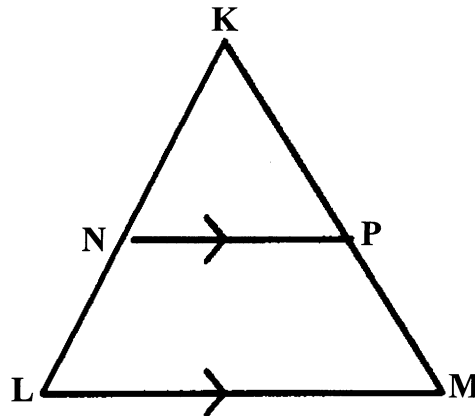
(3)

[8]

SECTION E
RATIO, PROPORTION AND SIMILARITY
OPTIONAL

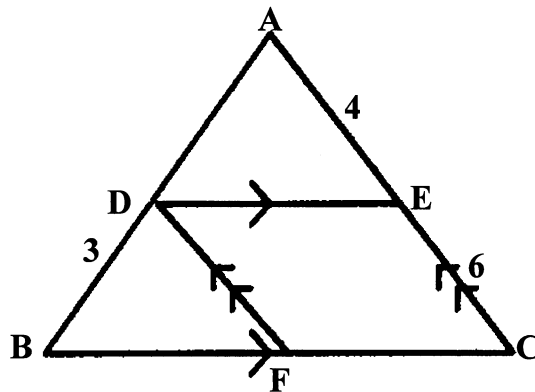
QUESTION 16

16.1 In the diagram: $NP \parallel LM$.



Write down one proportionality which applies to the diagram. (2)

16.2 In $\triangle ABC$: $DE \parallel BC$, $DF \parallel AC$, $AE = 4$ m, $EC = 6$ m and $DB = 3$ m



Calculate the lengths of

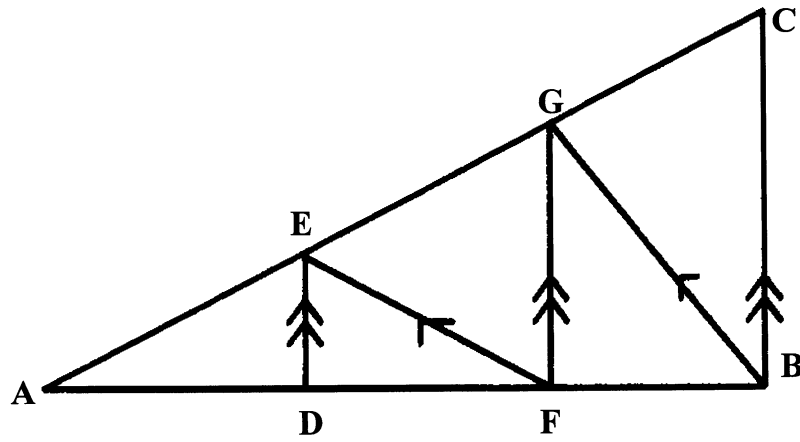
16.2.1 AD (3)

16.2.2 BF if $FC = 4$ m (3)

[8]

VRAAG 17

In die skets: $DE \parallel FG \parallel BC$ en $EF \parallel GB$



17.1 $\frac{AD}{DF} = \frac{\dots}{\dots}$ (2)

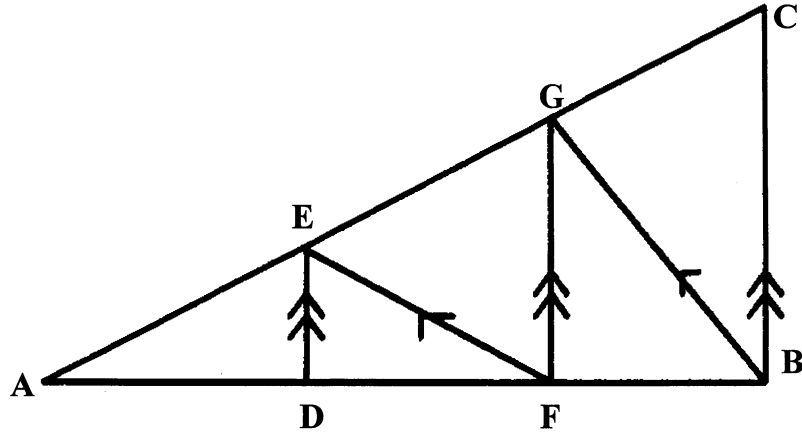
17.2 In $\triangle ABG$: $\frac{AF}{FB} = \frac{\dots}{\dots}$ (2)

17.3 In $\triangle ABC$: $\frac{AF}{FB} = \frac{\dots}{\dots}$ (2)

17.4 Wat kan jy uit 17.2 en 17.3 aflei? (1)
 [7]

QUESTION 17

In the sketch: $DE \parallel FG \parallel BC$ and $EF \parallel GB$



17.1 $\frac{AD}{DF} = \frac{\dots}{\dots}$ (2)

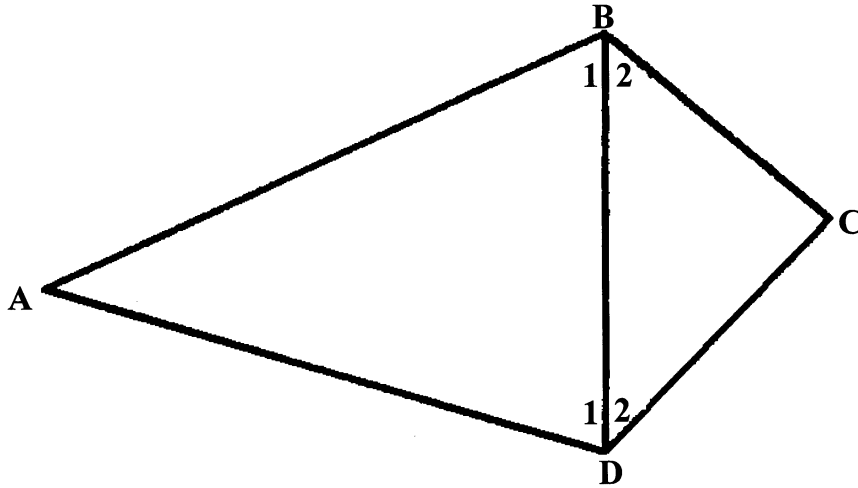
17.2 In $\triangle ABG$: $\frac{AF}{FB} = \frac{\dots}{\dots}$ (2)

17.3 In $\triangle ABC$: $\frac{AF}{FB} = \frac{\dots}{\dots}$ (2)

17.4 What can you derive from 17.2 and 17.3? (1)
[7]

VRAAG 18

In die figuur: $\hat{B}_1 = \hat{B}_2, \hat{D}_1 = \hat{D}_2$



Voltooi:

18.1 $\hat{A} = \dots$ (1)

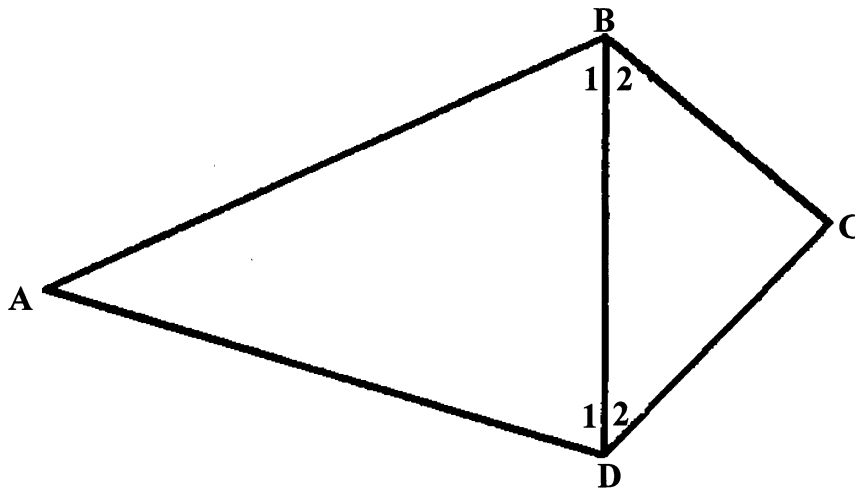
18.2 $\triangle ABD \dots \triangle CBD$ (1)

18.3 $\frac{AB}{\dots} = \frac{BD}{\dots} = \frac{\dots}{CD}$ (3)

[5]

QUESTION 18

In the figure: $\hat{B}_1 = \hat{B}_2, \hat{D}_1 = \hat{D}_2$



Complete:

18.1 $\hat{A} = \dots$ (1)

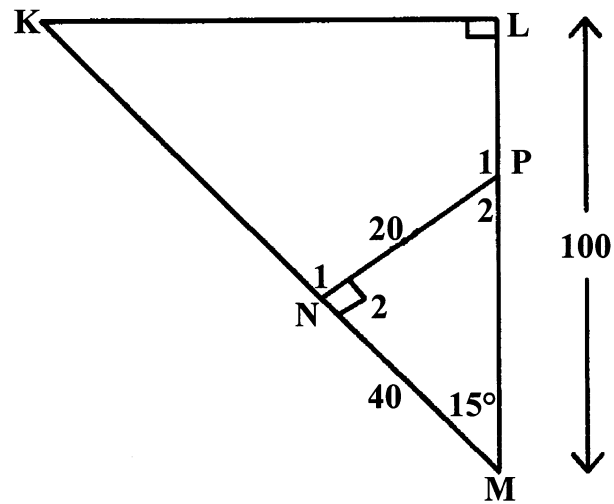
18.2 $\triangle ABD \dots \triangle CBD$ (1)

18.3 $\frac{AB}{\dots} = \frac{BD}{\dots} = \frac{\dots}{CD}$ (3)

[5]

VRAAG 19

In $\triangle KLM$: $\hat{L} = \hat{N}_2 = 90^\circ$, $\hat{M} = 15^\circ$, $LM = 100$, $NP = 20$ en $NM = 40$

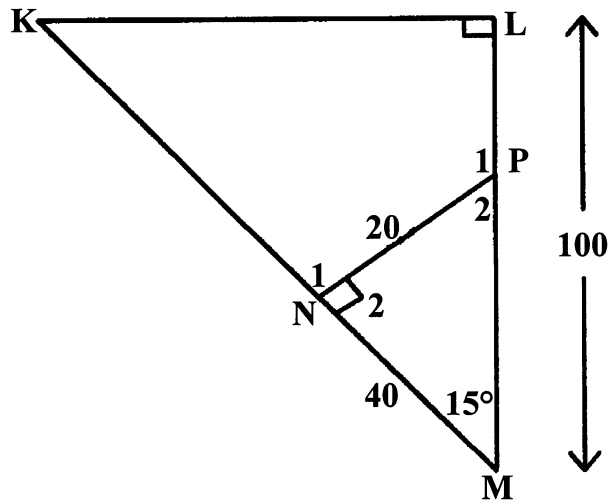


- 19.1 Bereken \hat{P}_2 en \hat{K} (2)
- 19.2 Gee redes waarom $\triangle MLK \parallel \triangle MNP$ (3)
- 19.3 Bereken die waarde van die verhouding $\frac{ML}{MN}$ (2)
- 19.4 Bereken die lengte van KL. (3)

[10]

QUESTION 19

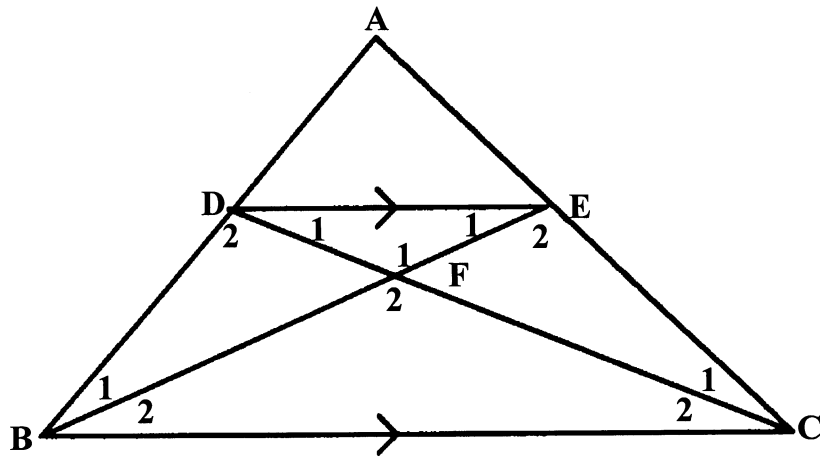
In $\triangle KLM$: $\hat{L} = \hat{N}_2 = 90^\circ$, $\hat{M} = 15^\circ$, $LM = 100$, $NP = 20$ and $NM = 40$



- 19.1 Calculate \hat{P}_2 and \hat{K} (2)
- 19.2 Give reasons why $\triangle MLK \parallel \triangle MNP$ (3)
- 19.3 Calculate the value of the ratio $\frac{ML}{MN}$ (2)
- 19.4 Calculate the length of KL. (3)

[10]

VRAAG 20



In die figuur: $DE \parallel BC$, $\hat{D}_1 = 40^\circ$ en $\hat{E}_1 = 30^\circ$

20.1 Bereken, met redes, \hat{B}_2 en \hat{C}_2 (4)

20.2 Gee redes waarom $\triangle DEF \sim \triangle CBF$ (3)
[7]

TOTAAL VIR AFDELING E: [37]

AFDELING F
STATISTIEK
OPSIONEEL

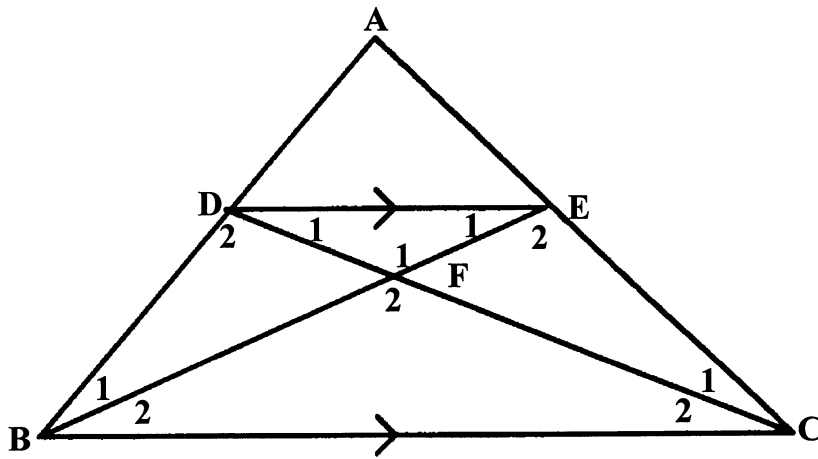
VRAAG 21

In 'n opname wat gemaak is oor die Wiskunde toetspunte van 'n groep van 45 leerders is die volgende gevind:

Ouderdom in jare								
8	7	44	35	40	50	51	34	17
25	19	15	40	43	48	86	52	25
80	32	30	25	27	40	35	65	55
20	13	36	42	63	53	67	32	13
20	18	17	63	29	46	72	49	69

21.1 Stel die inligting hierbo voor met behulp van 'n stingel-en-blaardiagram. (4)

QUESTION 20



In the figure: $DE \parallel BC$, $\hat{D}_1 = 40^\circ$ and $\hat{E}_1 = 30^\circ$

20.1 Calculate, giving reasons, \hat{B}_2 and \hat{C}_2 (4)

20.2 Give reasons why $\triangle DEF \parallel \triangle CBF$ (3)
[7]

TOTAL FOR SECTION E: [37]

SECTION F
STATISTICS
OPTIONAL

QUESTION 21

In a survey of the Mathematics test results of 45 learners the following is found:

Age in years								
8	7	44	35	40	50	51	34	17
25	19	15	40	43	48	86	52	25
80	32	30	25	27	40	35	65	55
20	13	36	42	63	53	67	32	13
20	18	17	63	29	46	72	49	69

21.1 Present this information on a stem-and-leaf diagram. (4)

21.2

Klasinterval	Telling	Frekwensie	Kumulatiewe frekwensie
7 – 16			
17 – 26			
27 – 36			
37 – 46			
47 – 56			
57 – 66			
67 – 76			
77 – 86			

- 21.2.1 Teken en voltooi die tabel in jou antwoordboek. (8)
- 21.2.2 Teken 'n histogram van die frekwensie op die grafiekpapier. Gebruik die grafiekpapier gegee op bl. 21. (4)
- 21.2.3 Teken die kumulatiewe frekwensiekurwe op die grafiekpapier. Gebruik die grafiekpapier gegee op bl. 22. (4)
- 21.2.4 Gebruik jou grafiek om die eerste kwartiel en die derde kwartiel te bepaal. (2)
- 21.3 Herrangskik die ouderdomme in stygende orde. (2)
- 21.4 Skryf die modus neer van die ouderdomme. (2)
- 21.5 Bepaal die mediaan van die ouderdomme. (1)
- 21.6 Bereken die rekenkundige gemiddelde van die ouderdomme, afgerond tot die naaste heelgetal. (3)
- 21.7 Bereken die gebied (omvang) van die ouderdomme. (2)
- 21.8 Bereken die standaardafwyking van die ouderdomme. Rond die antwoord af tot een desimale syfer. (5)

TOTAAL VIR AFDELING F: [37]

TOTAAL: 150

21.2

Class interval	Score	Frequency	Cumulative frequency
7 – 16			
17 – 26			
27 – 36			
37 – 46			
47 – 56			
57 – 66			
67 – 76			
77 – 86			

21.2.1 Redraw the table in your answer book and complete it. (8)

21.2.2 Draw a histogram of the frequency on the graph paper given on p 21. (4)

21.2.3 Draw the cumulative frequency curve on the graph paper given on p 22. (4)

21.2.4 Use your graph to determine the first quartile and third quartile. (2)

21.3 Rearrange the ages in ascending order. (2)

21.4 Write down the mode of the ages. (2)

21.5 Determine the median of the ages. (1)

21.6 Calculate the arithmetic mean of the ages, rounded off to the nearest integer. (3)

21.7 Calculate the range of the ages. (2)

21.8 Calculate the standard deviation of the ages. Round off your answer correct to one decimal digit. (5)

TOTAL FOR SECTION F: [37]

TOTAL: 150

INFORMATION SHEET / INLIGTINGSBLAD

**1. CO-ORDINATE GEOMETRY /
KOÖRDINAATMEETKUNDE**

$$M_{(x;y)} = \left(\frac{x_A + x_B}{2}, \frac{y_A + y_B}{2} \right)$$

$$d_{AB} = \sqrt{(x_B - x_A)^2 + (y_B - y_A)^2}$$

$$m_{AB} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$y = mx + c$$

$$y - y_1 = m(x - x_1)$$

$$\frac{y - y_1}{x - x_1} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{x}{a} + \frac{y}{b} = 1$$

$$x^2 + y^2 = r^2$$

**4. CONSUMER MATHEMATICS /
VERBRUIKERSWISKUNDE**

$$I = \frac{krt}{100}$$

$$A = P \left(1 + \frac{r}{100} \right)^n$$

5. STATISTICS / STATISTIEK

$$S = \sqrt{\frac{\sum x^2 - n\bar{x}^2}{n-1}}$$

$$\hat{C} = \sqrt{\frac{\sum x^2 - N\mu^2}{N}}$$

**2. TRIGONOMETRY /
TRIGONOMETRIE**

For any ΔABC : / *Vir enige ΔABC :*

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cdot \cos A$$

$$\text{Area / Oppervlakte } \Delta ABC = \frac{1}{2} a \cdot b \cdot \sin C$$

**3. CIRCULAR MEASUREMENT /
BOOGMAAT**

$$S = r\theta$$

$$A = \frac{1}{2} r^2 \theta$$

$$A = \frac{1}{2} rs$$

$$V = r\omega$$

$$\omega = 2\pi f$$

$$A = \frac{1}{2} r^2 (\theta - \sin \theta)$$

CANDIDATE'S NUMBER / KANDIDAAT SE NOMMER

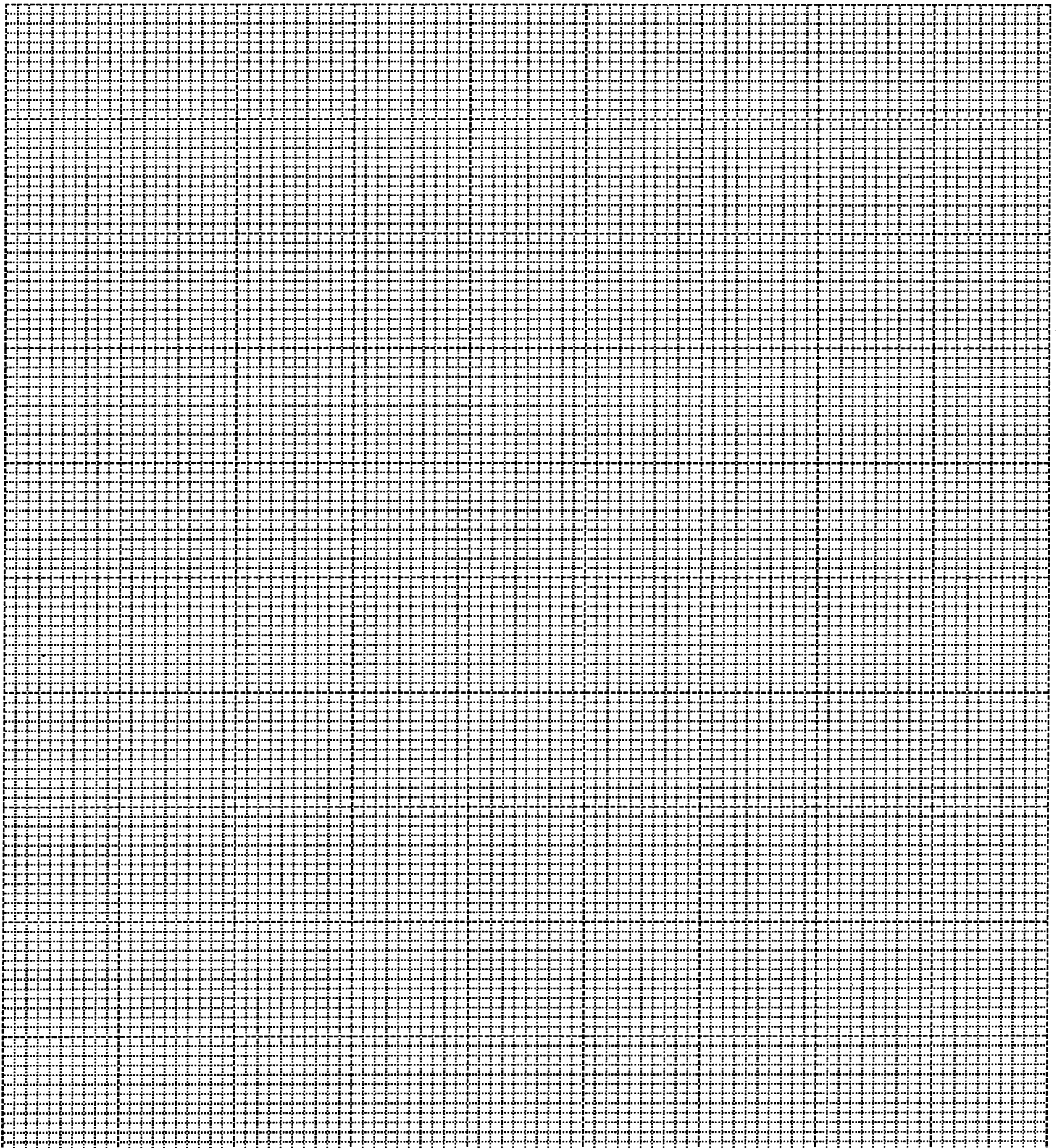
8	0	4
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INSTRUCTION / INSTRUKSIE:

- Use this graph paper for Question 10 and place it at the back of your answer book.
- *Gebruik hierdie grafiekpapier vir Vraag 10 en plaas dit agter in jou antwoordboek.*



CANDIDATE'S NUMBER / KANDIDAAT SE NOMMER

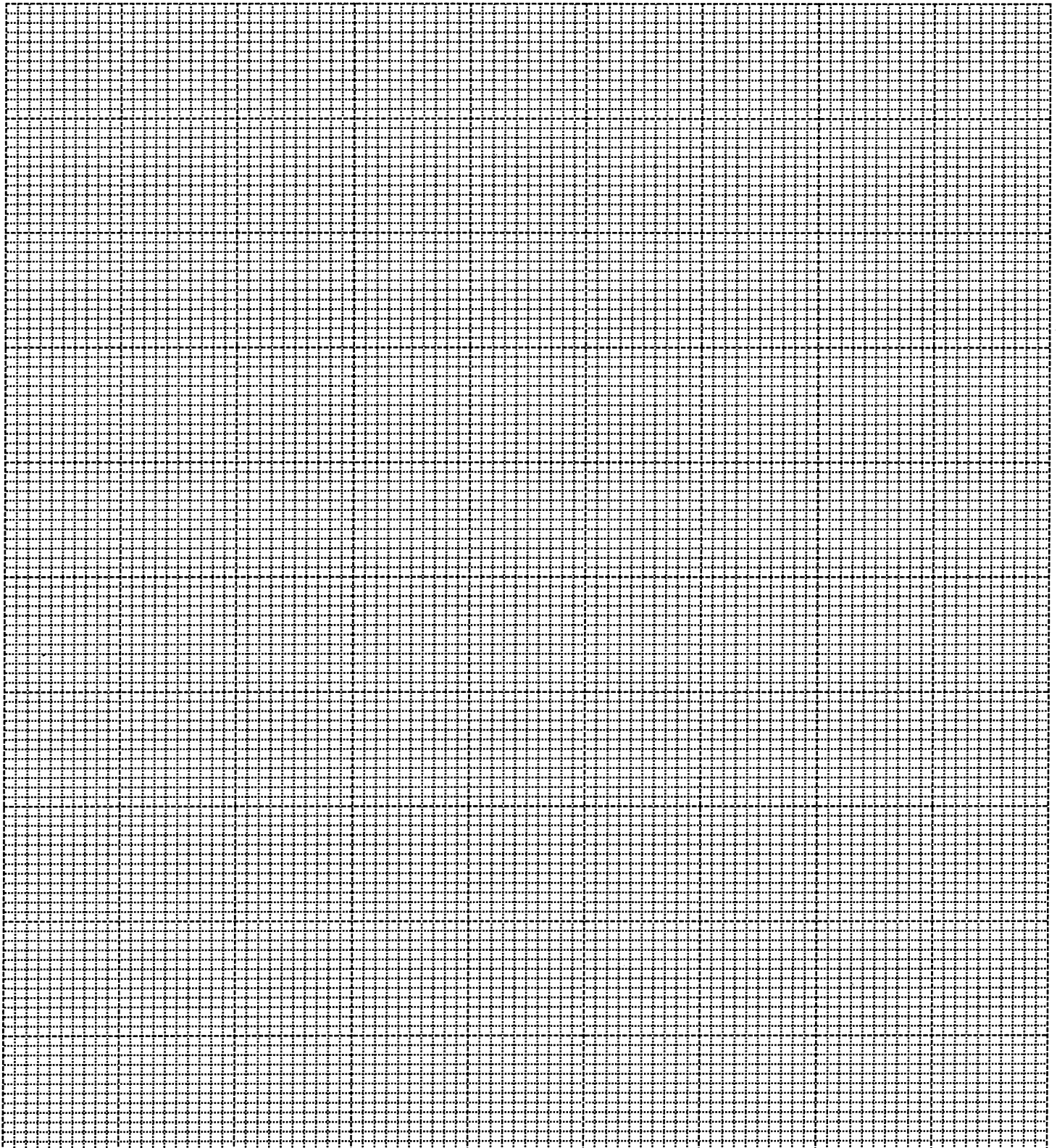
8	0	4
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INSTRUCTION / INSTRUKSIE:

- Use this graph paper for Question 21.2.2 and place it at the back of your answer book.
- *Gebruik hierdie grafiekpapier vir Vraag 21.2.2 en plaas dit agter in jou antwoordboek.*



CANDIDATE'S NUMBER / *KANDIDAAT SE NOMMER*

8	0	4
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INSTRUCTION / INSTRUKSIE:

- Use this graph paper for Question 21.2.3 and place it at the back of your answer book.
- *Gebruik hierdie grafiekpapier vir Vraag 21.2.3 en plaas dit agter in jou antwoordboek.*

