



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICS P3

FEBRUARY/MARCH 2012

MARKS: 100

TIME: 2 hours



This question paper consists of 11 pages, 3 diagram sheets and 1 information sheet.



INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 11 questions.
2. Answer ALL the questions.
3. Clearly show ALL calculations, diagrams, graphs et cetera, that you have used in determining your answers.
4. Answers only will not necessarily be awarded full marks.
5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, round your answers off to TWO decimal places, unless stated otherwise.
7. Diagrams are NOT necessarily drawn to scale.
8. THREE diagram sheets for answering QUESTION 4.2, QUESTION 8, QUESTION 9, QUESTION 10, QUESTION 11.1 and QUESTION 11.2 are attached at the end of this question paper. Write your centre number and examination number on these sheets in the spaces provided and insert the sheets inside the back cover of your ANSWER BOOK.
9. An information sheet, with formulae, is included at the end of the question paper.
10. Number the answers correctly according to the numbering system used in this question paper.
11. Write neatly and legibly.

QUESTION 1

The first FOUR terms of the sequence of numbers are 2; 5; 10 and 17.

- 1.1 Write down the next TWO terms in the sequence. (2)
- 1.2 Write down a recursive formula for the sequence. (3)
- [5]

QUESTION 2

A large company employs several people. The table below shows the number of people employed in each position and the monthly salary paid to each person in that position.

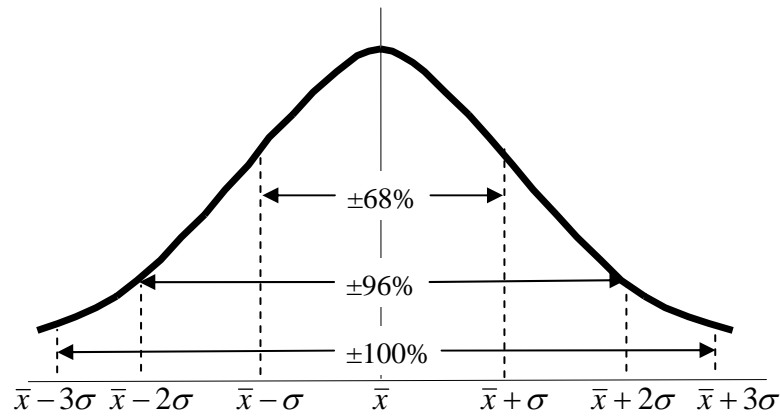
POSITION	NUMBER EMPLOYED IN POSITION	MONTHLY SALARY PER PERSON (IN RAND)
Managing director	1	150 000
Director	2	100 000
Manager	2	75 000
Foreman	5	15 000
Skilled workers	30	10 000
Semi-skilled workers	40	7 500
Unskilled workers	65	6 000
Administration	5	5 000

- 2.1 Calculate the total number of people employed at this company. (1)
- 2.2 Calculate the total amount needed to pay salaries for ONE month. (2)
- 2.3 Determine the mean monthly salary for an employee in this company. (2)
- 2.4 Is the mean monthly salary calculated in QUESTION 2.3 a good indicator of an employee's monthly salary? Motivate your answer. (2)
- [7]



QUESTION 3

The number of SMS messages sent by a group of teenagers was recorded over a period of a week. The data was found to be normally distributed with a mean of 140 messages and a standard deviation of 12 messages.



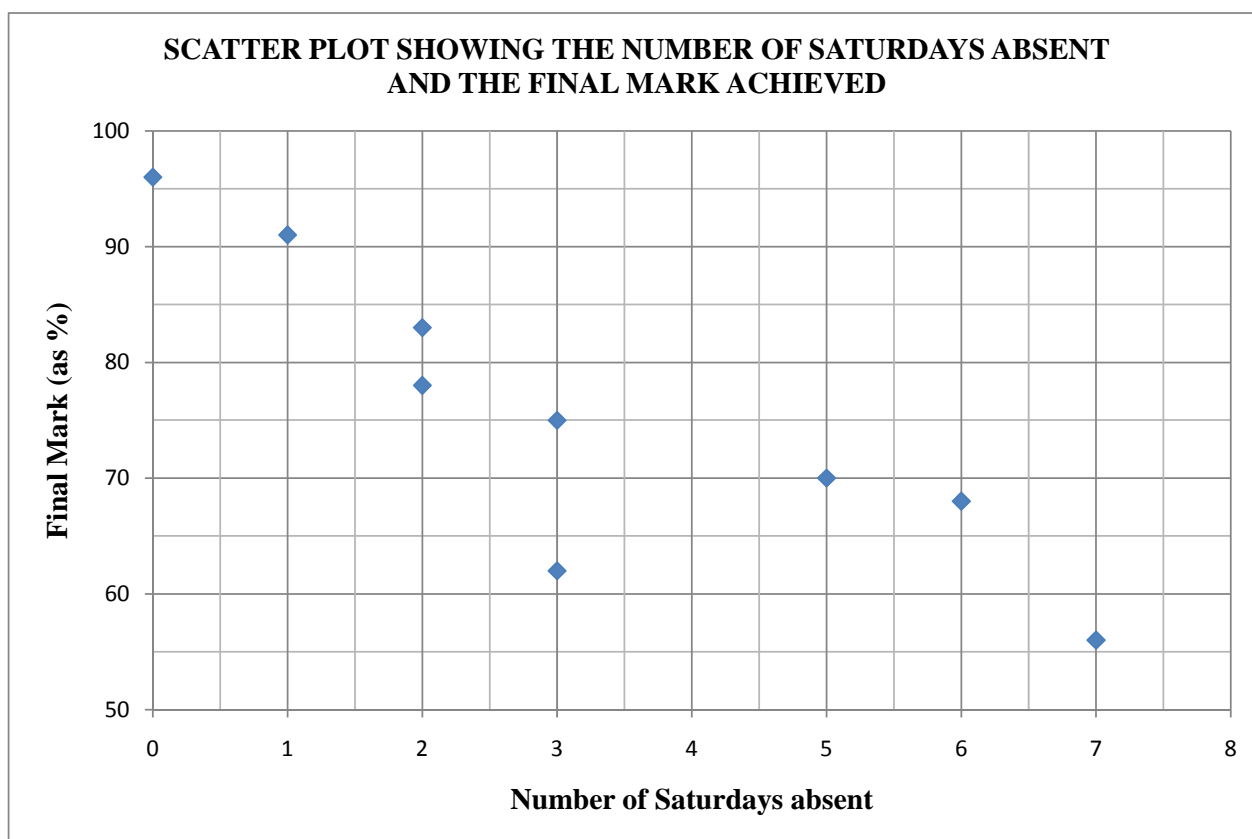
Answer the following questions with reference to the information provided in the graph:

- 3.1 What percentage of teenagers sent less than 128 messages? (3)
- 3.2 What percentage of teenagers sent between 116 and 152 messages? (3)
- [6]

QUESTION 4

A group of students attended a course in Statistics on Saturdays over a period of 10 months. The number of Saturdays on which a student was absent was recorded against the final mark the student obtained. The information is shown in the table below and the scatter plot is drawn for the data.

Number of Saturdays absent	0	1	2	2	3	3	5	6	7
Final mark (as %)	96	91	78	83	75	62	70	68	56



- 4.1 Calculate the equation of the least squares regression line. (4)
 - 4.2 Draw the least squares regression line on the grid provided on DIAGRAM SHEET 1. (2)
 - 4.3 Calculate the correlation coefficient. (2)
 - 4.4 Comment on the trend of the data. (2)
 - 4.5 Predict the final mark of a student who was absent for four Saturdays. (2)
- [12]**

QUESTION 5

The sports director at a school analysed data to determine how many learners play sport and what the gender of each learner is. The data is presented in the table below.

	DO NOT PLAY SPORT	PLAY SPORT	TOTAL
Male	51	69	120
Female	49	67	116
Total	100	136	236

- 5.1 Determine the probability that a learner, selected at random, is:
- 5.1.1 Male (2)
- 5.1.2 Female and plays sport (2)
- 5.2 Are the events 'male' and 'do not play sport' mutually exclusive? Use the values in the table to justify your answer. (2)
- 5.3 Are the events 'male' and 'do not play sport' independent? Show ALL calculations to support your answer. (4)
- [10]**

QUESTION 6

In a factory, three machines, A, B and C, are used to manufacture plastic bottles. They produce 20%, 30% and 50% respectively of the total production. 1%, 2% and 6% respectively of the plastic bottles produced by machines A, B and C are defective.

- 6.1 Represent the information by means of a tree diagram. Clearly indicate the probability associated with each branch of the tree diagram and write down all the outcomes. (4)
- 6.2 A plastic bottle is selected at random from the total production.
- 6.2.1 What is the probability that it was produced by machine B and it is not defective? (3)
- 6.2.2 What is the probability that the bottle is defective? (3)
- [10]**

QUESTION 7

Three items from four different departments of a major chain store will be featured in a one-page newspaper advertisement. The page layout for the advertisement is shown in the diagram below where one item will be placed in each block.

A	B	C
D	E	F
G	H	I
J	K	L

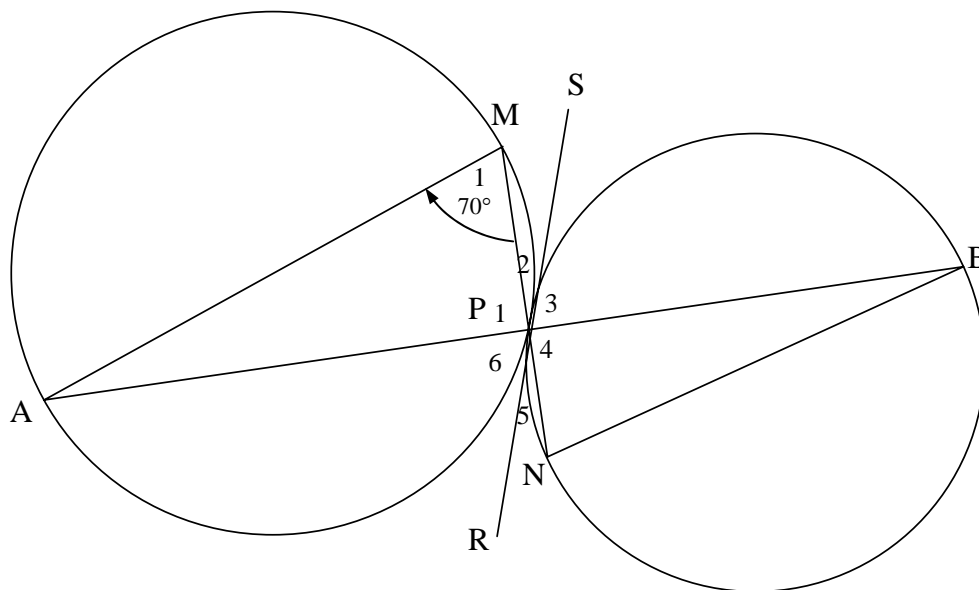
- 7.1 In how many different ways can all these items be arranged in the advertisement? (2)
- 7.2 In how many different ways can these items be arranged if specific items are to be placed in blocks A, F and J? (2)
- 7.3 In how many different ways can these items be arranged in the advertisement if items from the same department are grouped together in the same row? (3)
- [7]



In the next FOUR questions, ensure you give reasons for EACH statement you make.

QUESTION 8

In the diagram below, AM is the diameter of the bigger circle AMP . RPS is a common tangent to both circles at P . APB and MPN are straight lines.



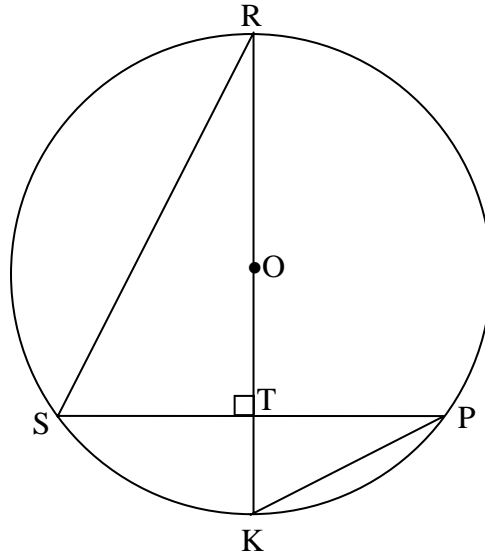
- 8.1 State the size of \hat{P}_1 . (1)
- 8.2 Hence, show that BN is the diameter of the smaller circle. (2)
- 8.3 If $\hat{M}_1 = 70^\circ$, calculate the size of each of the following angles:
- 8.3.1 \hat{A} (1)
- 8.3.2 \hat{P}_6 (1)
- 8.3.3 \hat{B} (2)
- [7]

QUESTION 9

In the diagram below, O is the centre of the circle with diameter RK .

$PS \perp RK$.

RK intersects PS at T .



- 9.1 If $PS = 4x$, write down the length of ST in terms of x . (1)
- 9.2 Prove that $\triangle RST \cong \triangle PKT$. (3)
- 9.3 If it is further given that $TK = x$ and $RT = 320$ mm, calculate the value of x . (3)
- [7]**

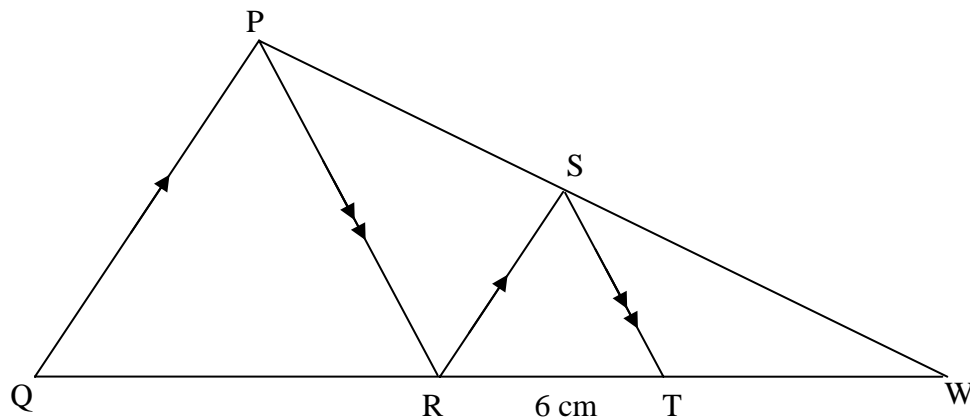
QUESTION 10

In $\triangle PQW$, S is a point on PW and R is a point on QW such that $SR \parallel PQ$.

T is a point on QW such that $ST \parallel PR$.

$RT = 6 \text{ cm}$

$WS : SP = 3 : 2$



Calculate:

10.1 WT (3)

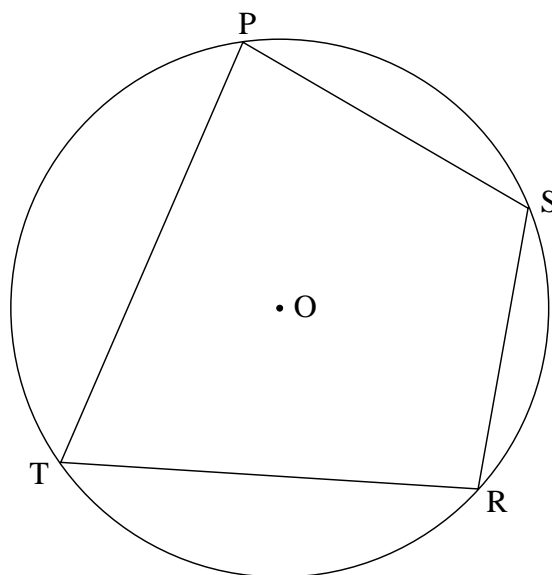
10.2 WQ (4)

[7]

QUESTION 11

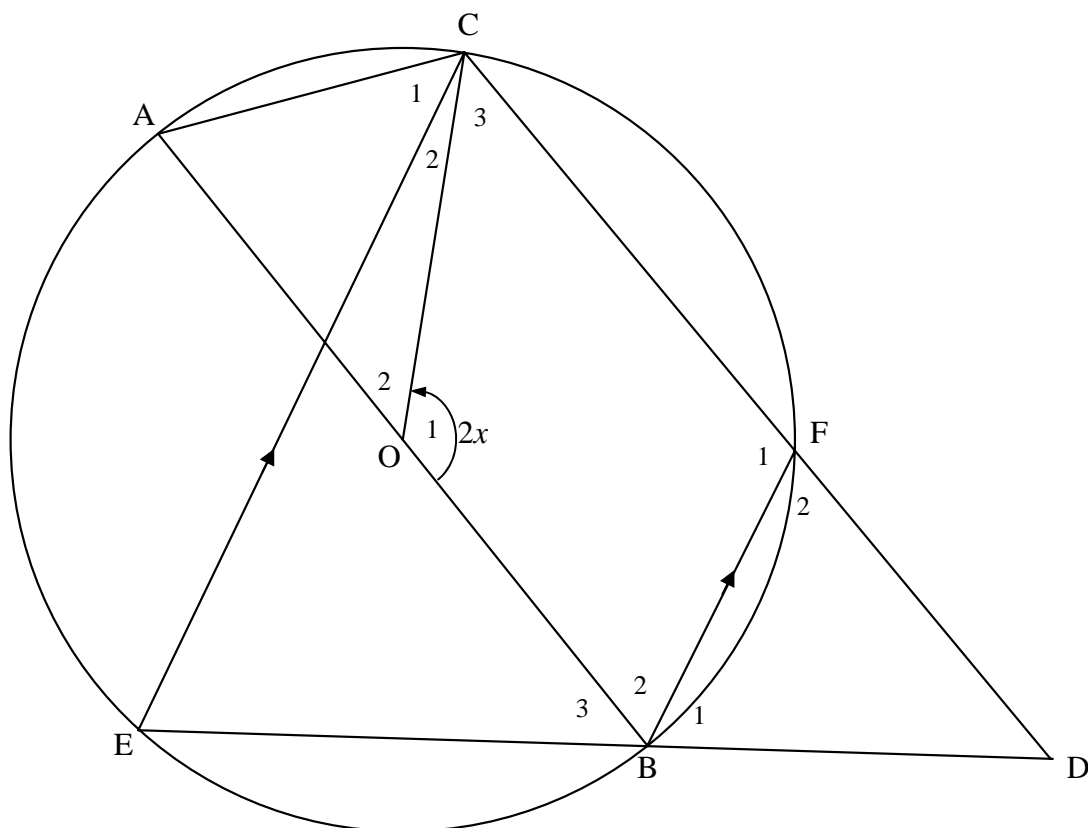
11.1 In the diagram below, O is the centre of the circle. $PSRT$ is a cyclic quadrilateral.

Prove the theorem that states $\hat{PTR} + \hat{PSR} = 180^\circ$.



(6)

- 11.2 In the diagram below, O is the centre of the circle. AB is a diameter of the circle. Chord CF produced meets chord EB produced at D . Chord EC is parallel to chord BF . CO and AC are joined. Let $\hat{O}_1 = 2x$



- 11.2.1 Determine, in terms of x , the size of \hat{F}_1 . (4)
- 11.2.2 Prove that $DF = BD$. (4)
- 11.2.3 Show that $\hat{C}_1 = \hat{C}_3$. (4)
- 11.2.4 If $DF = 5$ cm and $OA = 6$ cm, calculate area $\triangle BFD$: area $\triangle AOC$. (4)
- [22]**

TOTAL: 100



CENTRE NUMBER:

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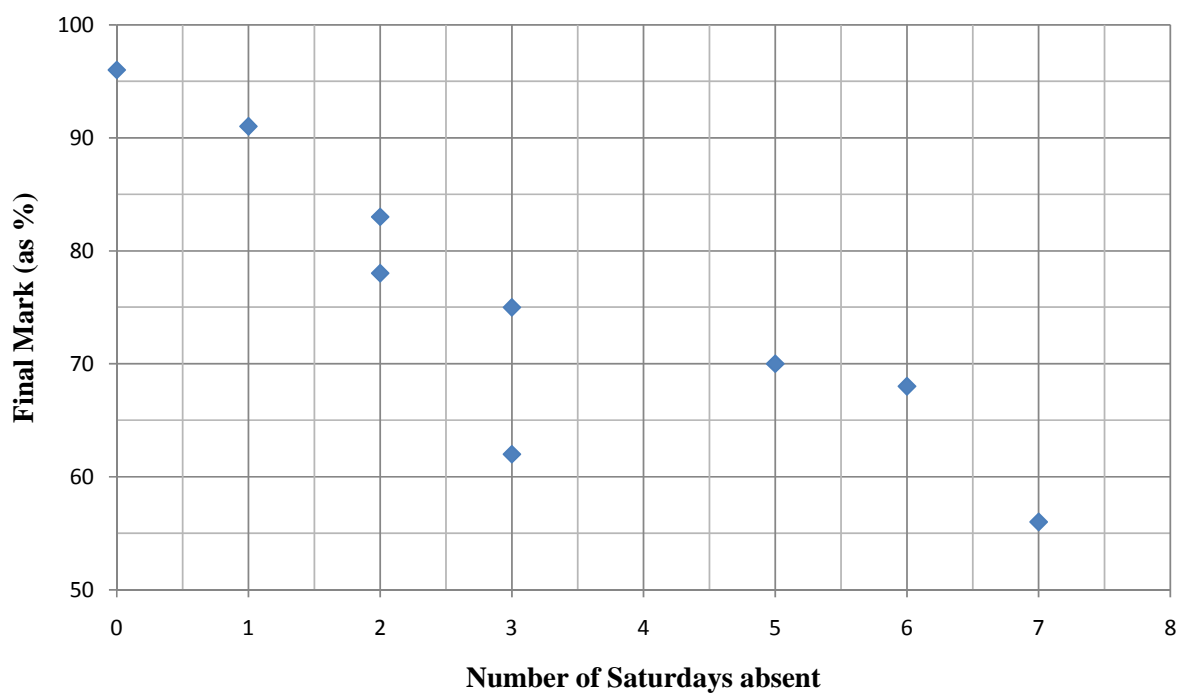
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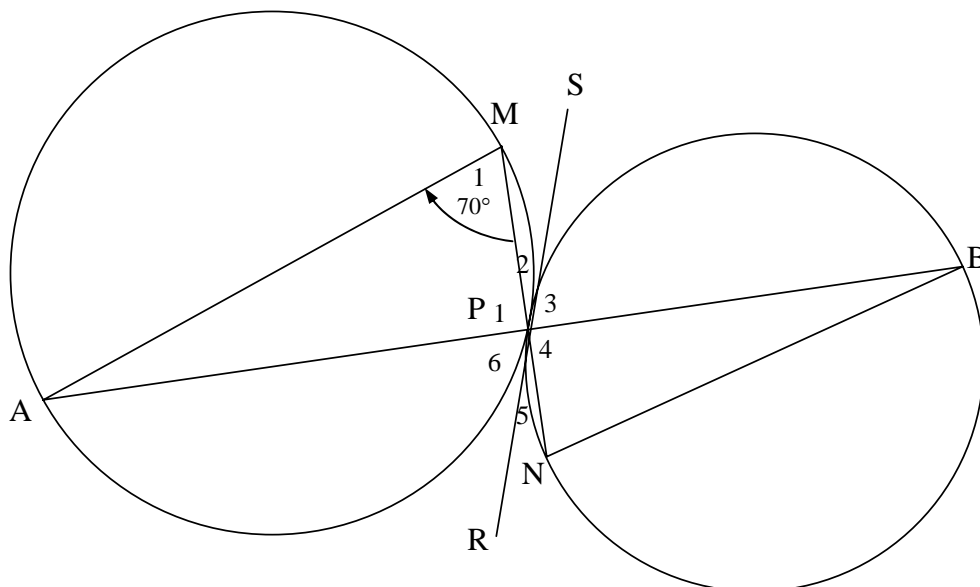
DIAGRAM SHEET 1

QUESTION 4.2

**SCATTER PLOT SHOWING THE NUMBER OF SATURDAYS ABSENT
AND THE FINAL MARK ACHIEVED**



QUESTION 8



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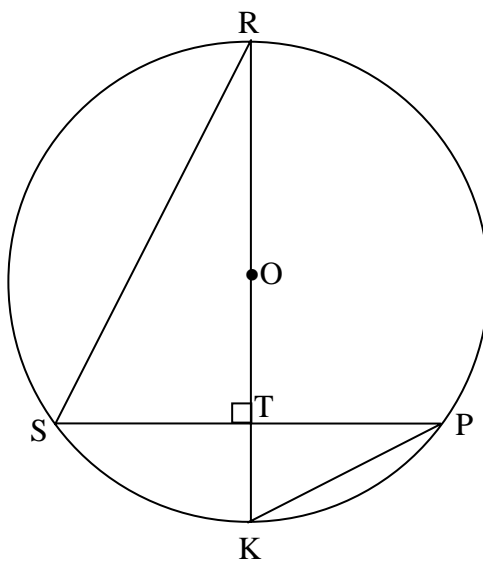
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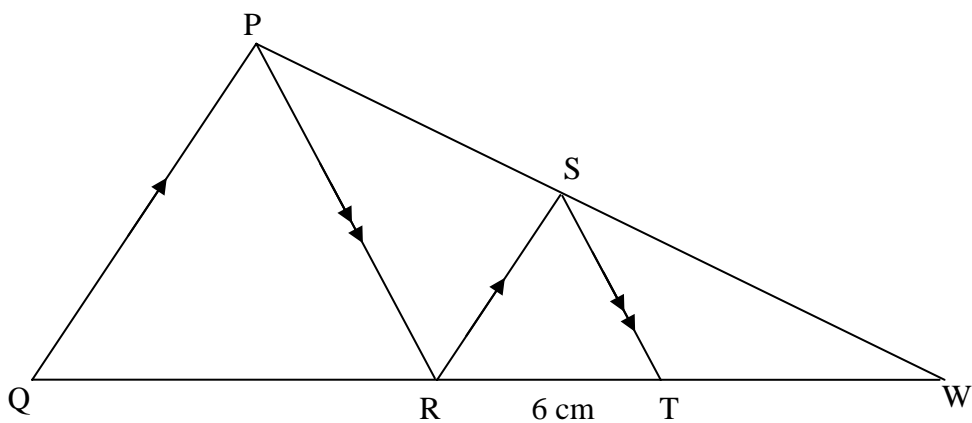
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DIAGRAM SHEET 2

QUESTION 9



QUESTION 10



CENTRE NUMBER:

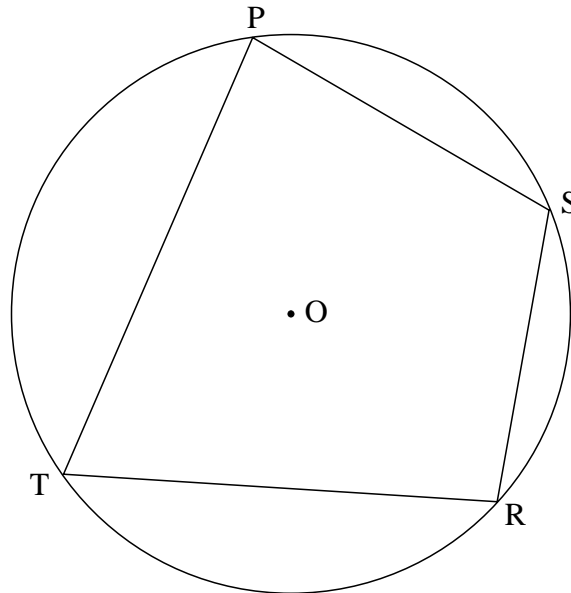
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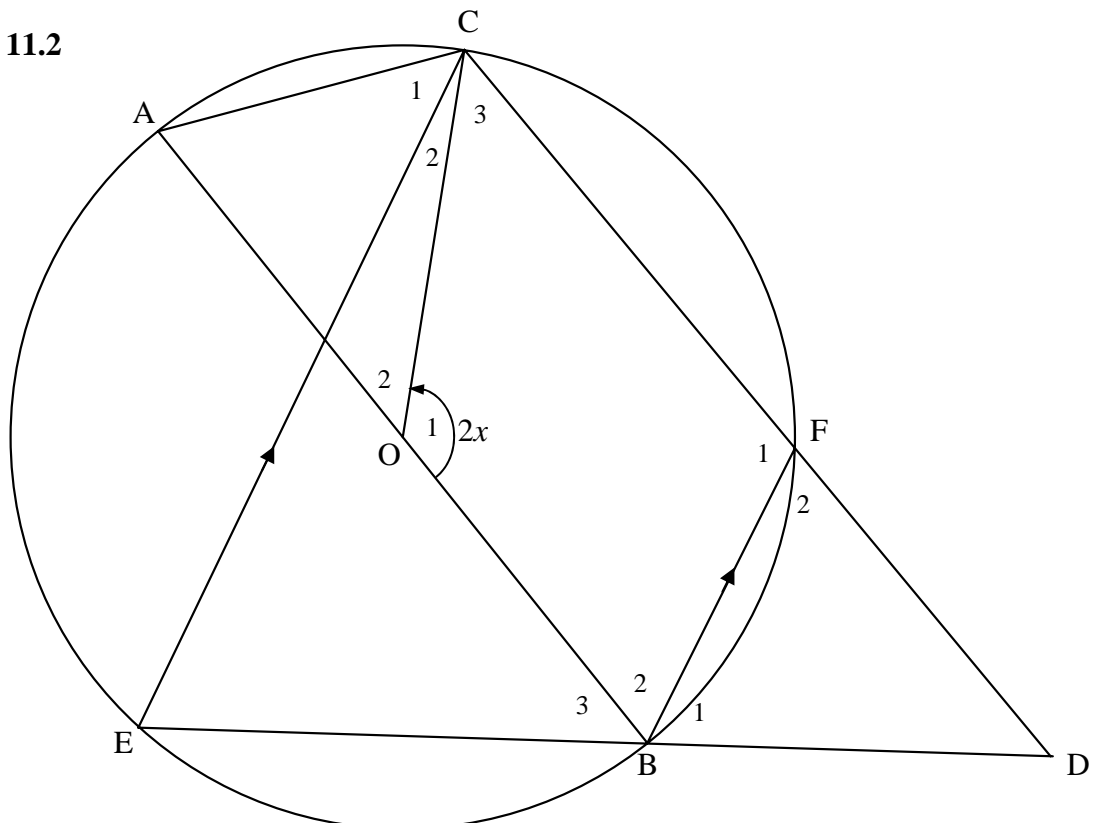
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DIAGRAM SHEET 3

QUESTION 11.1



QUESTION 11.2



INFORMATION SHEET: MATHEMATICS
INLIGTINGSBLAD: WISKUNDE

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$A = P(1 + ni)$$

$$A = P(1 - ni)$$

$$A = P(1 - i)^n$$

$$A = P(1 + i)^n$$

$$\sum_{i=1}^n 1 = n$$

$$\sum_{i=1}^n i = \frac{n(n+1)}{2}$$

$$T_n = a + (n-1)d$$

$$S_n = \frac{n}{2}(2a + (n-1)d)$$

$$T_n = ar^{n-1}$$

$$S_n = \frac{a(r^n - 1)}{r - 1}; \quad r \neq 1$$

$$S_\infty = \frac{a}{1 - r}; \quad -1 < r < 1$$

$$F = \frac{x[(1+i)^n - 1]}{i}$$

$$P = \frac{x[1 - (1+i)^{-n}]}{i}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

$$y = mx + c$$

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

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \tan \theta$$

$$(x - a)^2 + (y - b)^2 = r^2$$

$$\text{In } \triangle ABC: \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

$$\text{area } \triangle ABC = \frac{1}{2} ab \cdot \sin C$$

$$\sin(\alpha + \beta) = \sin \alpha \cdot \cos \beta + \cos \alpha \cdot \sin \beta$$

$$\sin(\alpha - \beta) = \sin \alpha \cdot \cos \beta - \cos \alpha \cdot \sin \beta$$

$$\cos(\alpha + \beta) = \cos \alpha \cdot \cos \beta - \sin \alpha \cdot \sin \beta$$

$$\cos(\alpha - \beta) = \cos \alpha \cdot \cos \beta + \sin \alpha \cdot \sin \beta$$

$$\cos 2\alpha = \begin{cases} \cos^2 \alpha - \sin^2 \alpha \\ 1 - 2\sin^2 \alpha \\ 2\cos^2 \alpha - 1 \end{cases}$$

$$\sin 2\alpha = 2 \sin \alpha \cdot \cos \alpha$$

$$(x; y) \rightarrow (x \cos \theta + y \sin \theta; y \cos \theta - x \sin \theta)$$

$$(x; y) \rightarrow (x \cos \theta - y \sin \theta; y \cos \theta + x \sin \theta)$$

$$\bar{x} = \frac{\sum fx}{n}$$

$$\sigma^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}$$

$$P(A) = \frac{n(A)}{n(S)}$$

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$\hat{y} = a + bx$$

$$b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$



INLIGTINGSBLAD: WISKUNDE
INFORMATION SHEET: MATHEMATICS

$$x = \frac{2a}{-b \pm \sqrt{b^2 - 4ac}}$$

$$A = P(1 + ni) \qquad A = P(1 - ni) \qquad A = P(1 - i)^n \qquad A = P(1 + i)^n$$

$$\sum_{i=1}^n 1 = n \qquad \sum_{i=1}^n i = \frac{n(n+1)}{2} \qquad T_n = a + (n-1)d \qquad S_n = \frac{2}{n}(2a + (n-1)d)$$

$$T_n = ar^{n-1} \qquad S_n = a \left(r^n - 1 \right) \div (r - 1) \qquad ; \qquad r \neq 1 \qquad S_{\infty} = \frac{1 - r}{a} \qquad ; \qquad -1 < r < 1$$

$$F^i = \overline{x^i [1 + i]^n - 1} \qquad P^i = \overline{x^i [1 + i]^n - 1}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

$$p = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \qquad M \left(x_1 + x_2, y_1 + y_2, \frac{z}{2} \right)$$

$$y = mx + c \qquad y - y_1 = m(x - x_1) \qquad m = \frac{y_2 - y_1}{x_2 - x_1} \qquad m = \tan \theta$$

$$(x-a)^2 + (y-b)^2 = r^2$$

$$In \triangle ABC: \qquad \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} \qquad a^2 = b^2 + c^2 - 2bc.\cos A$$

$$area \triangle ABC = \frac{1}{2} ab.\sin C$$

$$\sin(\alpha + \beta) = \sin \alpha.\cos \beta + \cos \alpha.\sin \beta \qquad \sin(\alpha - \beta) = \sin \alpha.\cos \beta - \cos \alpha.\sin \beta$$
$$\cos(\alpha + \beta) = \cos \alpha.\cos \beta - \sin \alpha.\sin \beta \qquad \cos(\alpha - \beta) = \cos \alpha.\cos \beta + \sin \alpha.\sin \beta$$

$$\left\{ \begin{array}{l} \cos^2 \alpha - \sin^2 \alpha \\ 1 - 2 \sin^2 \alpha \\ 2 \cos^2 \alpha - 1 \end{array} \right. \qquad \sin 2\alpha = 2 \sin \alpha.\cos \alpha$$

$$(x ; y) \leftrightarrow (x \cos \theta + y \sin \theta ; y \cos \theta - x \sin \theta) \qquad (x ; y) \leftrightarrow (x \cos \theta - y \sin \theta ; y \cos \theta + x \sin \theta)$$

$$\overline{x} = \sum f x^n$$

$$\sigma^2 = \frac{n}{\sum_{i=1}^n (x_i - \overline{x})^2}$$

$$\frac{P(A)}{n(A)} = \frac{n(S)}{n(A)}$$

$$P(A \text{ of } B) = P(A) + P(B) - P(A \text{ en } B)$$

$$\hat{y} = a + bx$$

Kopiereg voorbehou



EASTERN CAPE

SENTRUMNUMMER:

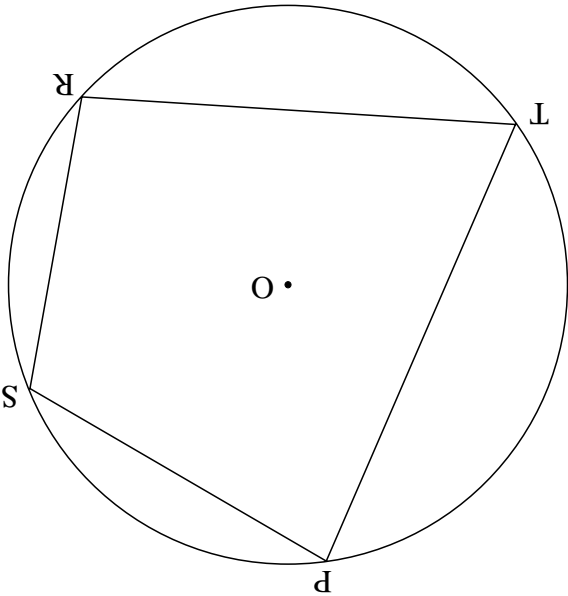
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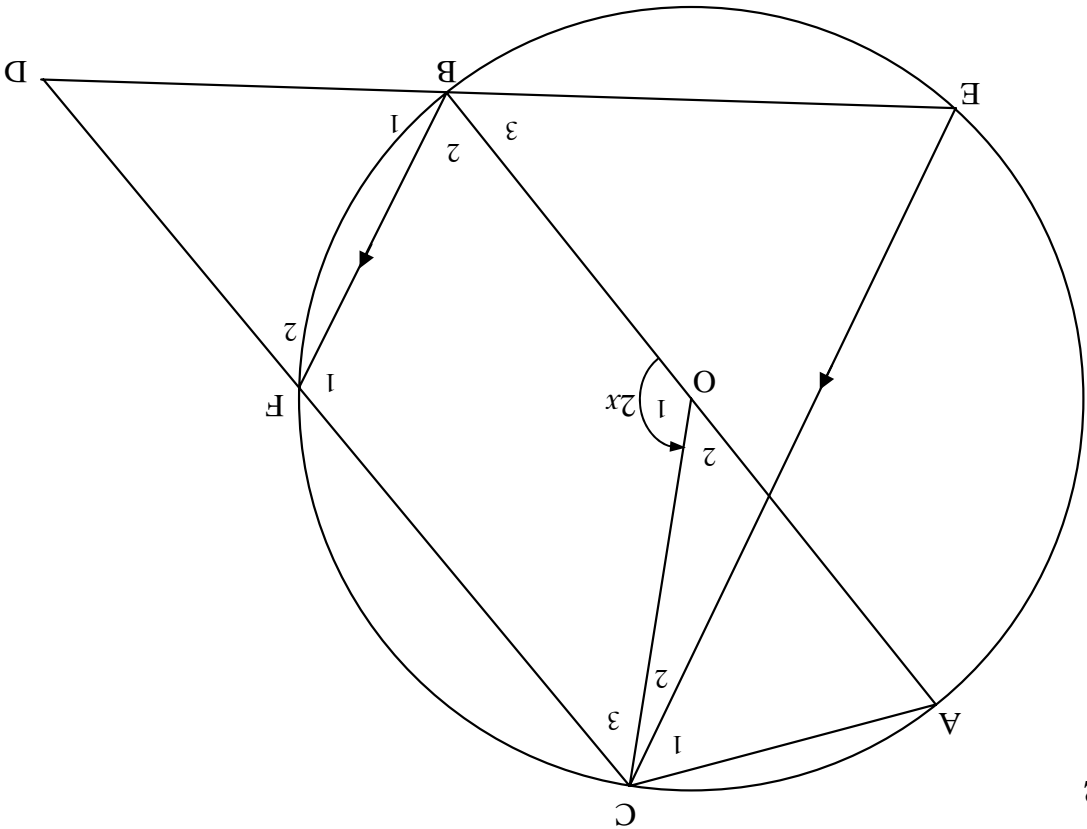
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DIAGRAFEL 3

VRAAG 11.1



VRAAG 11.2



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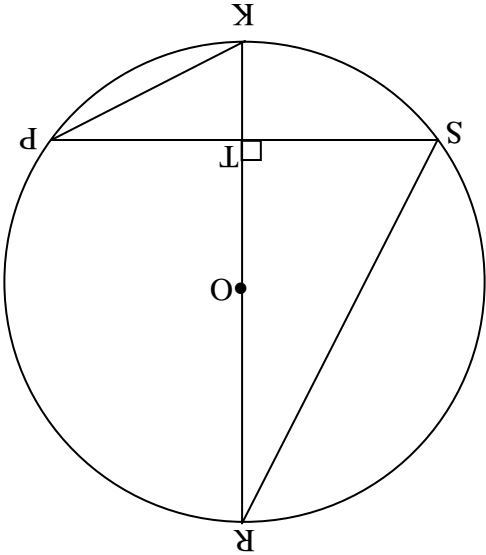
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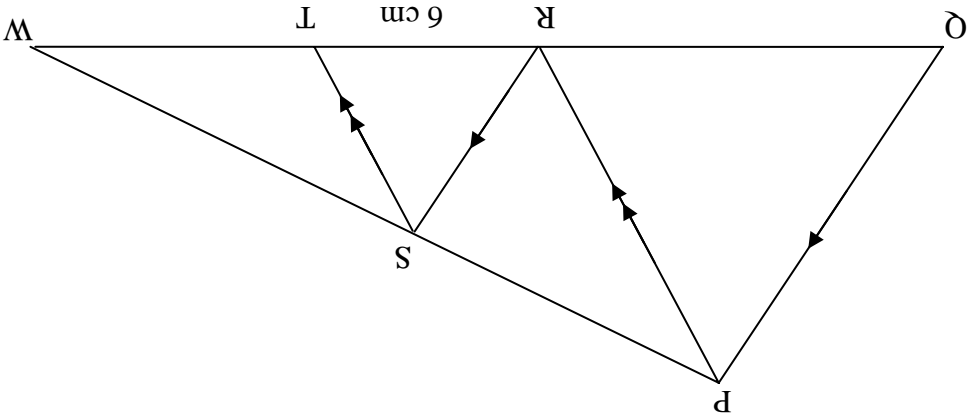
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DIAGRAM 2

VRAAG 9



VRAAG 10



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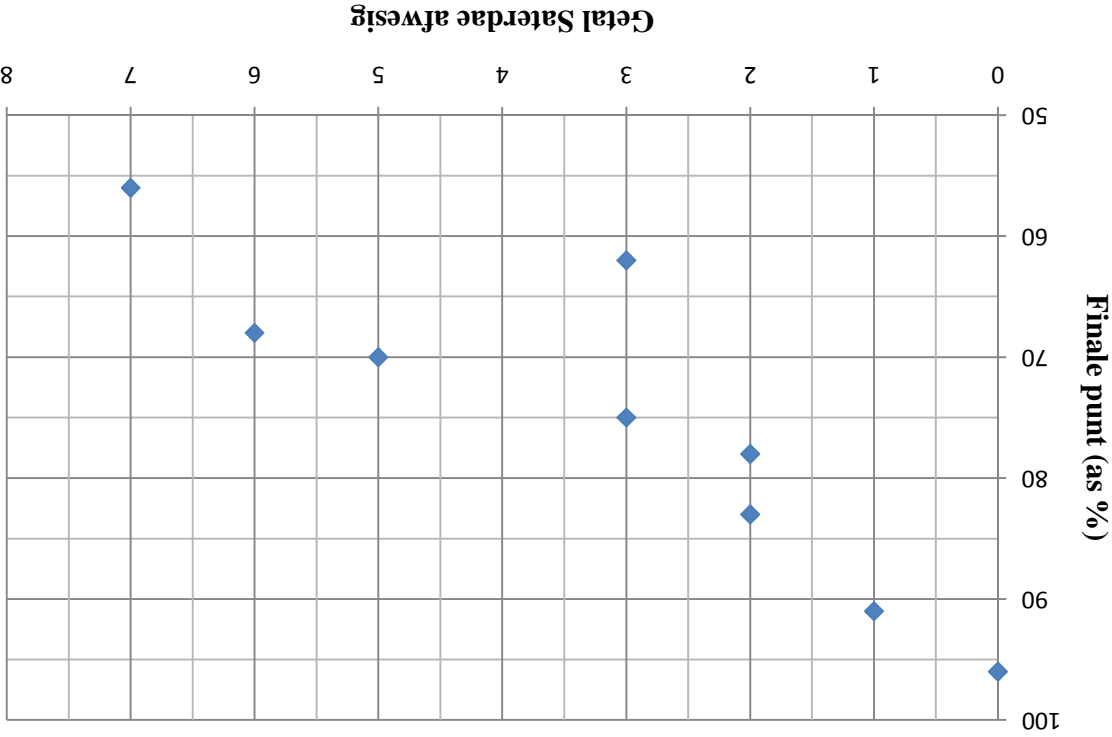
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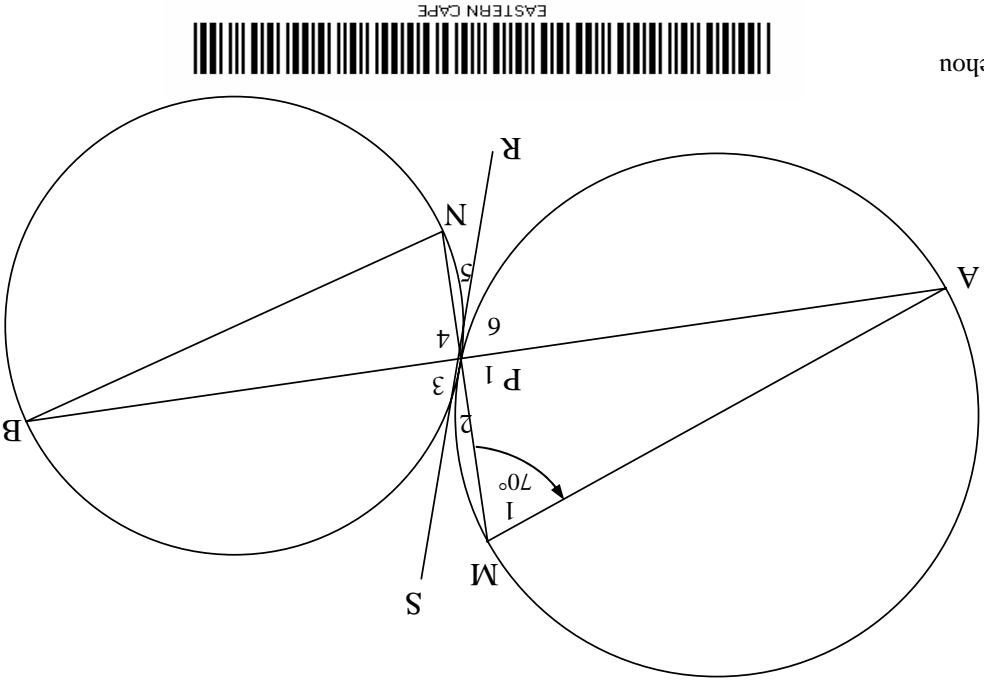
DIAGRAM V1

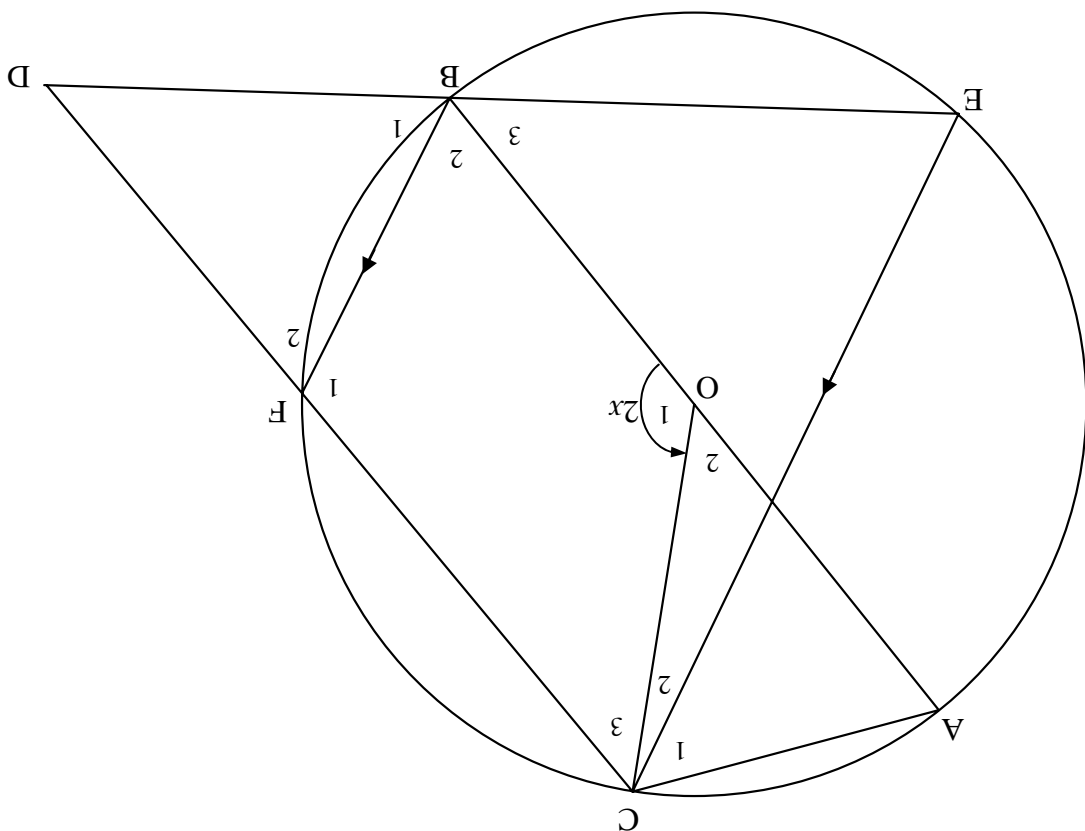
VRAAG 4.2

SPREIDDIAGRAM WAT DIE GETAL SATERDAE AFWESIG EN DIE FINALE PUNT BEHAAL, AANTOON



VRAAG 8



$$x_7 = 2x_1$$


- ### 11.2.2 Bewys dat $DF = BD$.

- ### 11.2.3 Toon dat $\hat{C}_1 = \hat{C}_3$.

- 11.2.4 As $DF = 5$ cm en $OA = 6$ cm, bereken

opperlakte ΔBFD : oppervlakte ΔAOC .

(4) [22]

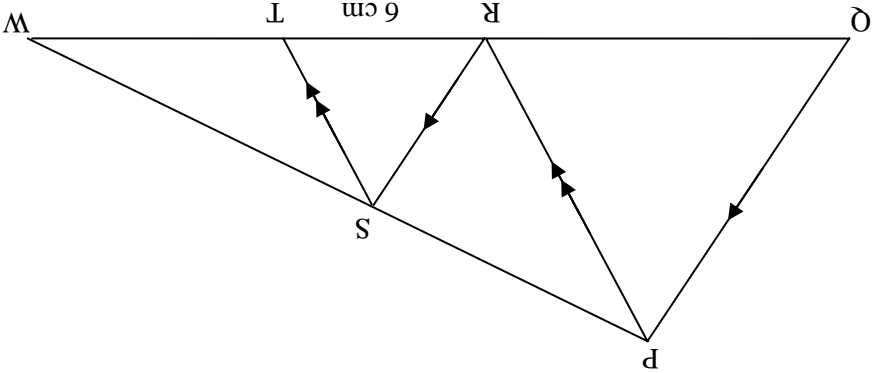
TOTAL:

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VRAAG 10

In $\triangle PQW$ is S 'n punt op PW en R is 'n punt op QW sodat $SR \parallel PQ$.
 T is 'n punt op QW sodat $ST \parallel PR$.
 $RT = 6 \text{ cm}$
 $WS : SP = 3 : 2$



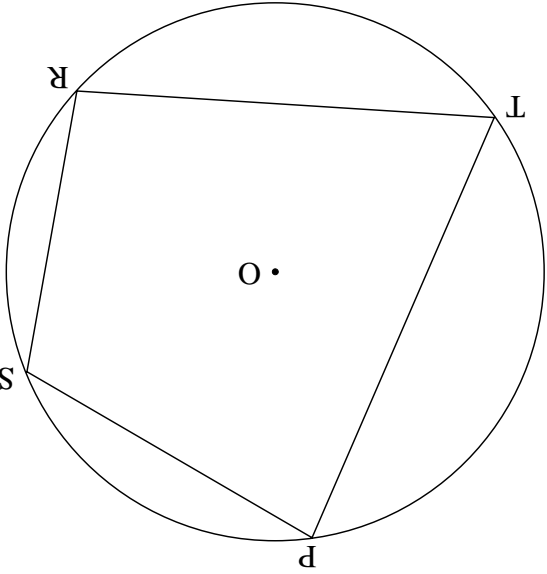
Bereken:

10.1 WT

10.2 WQ

VRAAG 11

11.1 In die diagram hieronder is O die middelpunt van die sirkel. $PSRT$ is 'n koordevierhoek.
Bewys die stelling wat beweer dat $\hat{PTR} + \hat{PSR} = 180^\circ$.



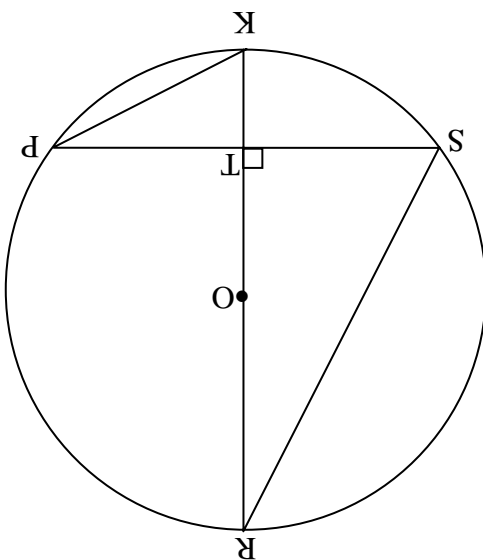
(3)
(4)
[7]



(6)

VRAAG 9

In die diagram hieronder is O die middelpunt van die sirkel met middellyn RK .
 $PS \perp RK$.
 RK sny PS by T .



- 9.1 As $PS = 4x$, skryf die lengte van ST in terme van x neer. (1)
- 9.2 Bewys dat $\triangle RST \cong \triangle PKT$. (3)
- 9.3 As dit verder gegee word dat $TK = x$ en $RT = 320$ mm, bereken die waarde van x . (3)

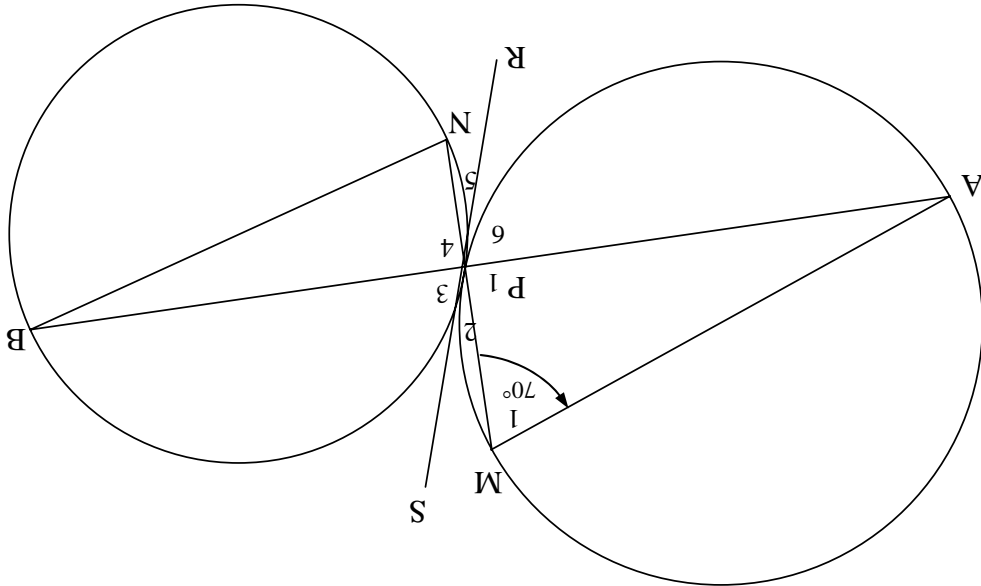
[7]



Maak seker dat jy in die volgende VIER vrae redes gee vir ELKE stelling wat jy maak.

VRAAG 8

In die diagram hieronder is AM die middellyn van die groter sirkel AMP . RPS is 'n gemene raaklyn aan beide sirkels by P . APB en MPN is reguitlyne.



8.1 Noem die grootte van \hat{P}_1 . (1)

8.2 Toon vervolgens dat BN die middellyn van die kleiner sirkel is. (2)

8.3 As $\hat{M}_1 = 70^\circ$, bereken die grootte van elk van die volgende hoekes: (1)

8.3.1 \hat{A}

8.3.2 \hat{P}_6

8.3.3 \hat{B}

(2)
[7]



VRAAG 7

Drie items van vier verskillende afdelings van 'n groot kettingwinkel sal op 'n eenbladsy-advertensie in 'n koerant verskyn. Die bladuitleg van die advertensie word in die diagram hieronder getoon, waar een item in elke blok geplaas sal word.

A	B	C
D	E	F
G	H	I
J	K	L

7.1 Op hoeveel verskillende maniere kan al hierdie items in die advertensie gerangskik word? (2)

7.2 Op hoeveel verskillende maniere kan hierdie items gerangskik word as spesifieke items in blok A, F en J geplaas moet word? (2)

7.3 Op hoeveel verskillende maniere kan hierdie items in die advertensie rangskik word as items van dieselfde afdeling saam in dieselfde ry gegroep word? (3)

[7]



VRAAG 5

Die sportdirekteur by 'n skool ontleed data om te bepaal hoeveel leerders aan sport deelneem en van watter geslag elke leerder is. Die data word in die tabel hieronder getoon.

	NEEM NIE AAN	SPORT DEEL	NEEM AAN	TOTAAL
Manlik	51	69	120	
Vroulik	49	67	116	
Totaal	100	136	236	

5.1 Bepaal die waarskynlikheid dat 'n leerder, wat willekeurig gekies is:

5.1.1 Manlik is (2)

5.1.2 Vroulik is en aan sport deelneem (2)

5.2 Is die gebeurtenisse 'manlik' en 'neem nie aan sport deel nie' onderling uitsluitend? Gebruik die waardes in die tabel om jou antwoord te regverdig. (2)

5.3 Is die gebeurtenisse 'manlik' en 'neem nie aan sport deel nie' onafhanklik? Toon ALLE berekeninge om jou antwoord te ondersteun. (4)

VRAAG 6

In 'n fabriek word drie masjiene, A, B en C, gebruik om plastiekbottels te vervaardig. Hulle vervaardig onderskeidelik 20%, 30% en 50% van die totale produksie. Onderskeidelik 1%, 2% en 6% van die plastiekbottels wat deur masjiene A, B en C vervaardig word, is foutief.

6.1 Stel die data deur middel van 'n boomdiagram voor. Dui duidelik die waarskynlikheid geassosieer met elke tak van die boomdiagram aan en skryf alle uitkomstige neer. (4)

6.2 'n Plastiekbottel word willekeurig uit die totale produksie gekies. (3)

6.2.1 Wat is die waarskynlikheid dat dit deur masjien B vervaardig is en nie foutief is nie? (3)

6.2.2 Wat is die waarskynlikheid dat die bottel foutief is? (3)

[10]

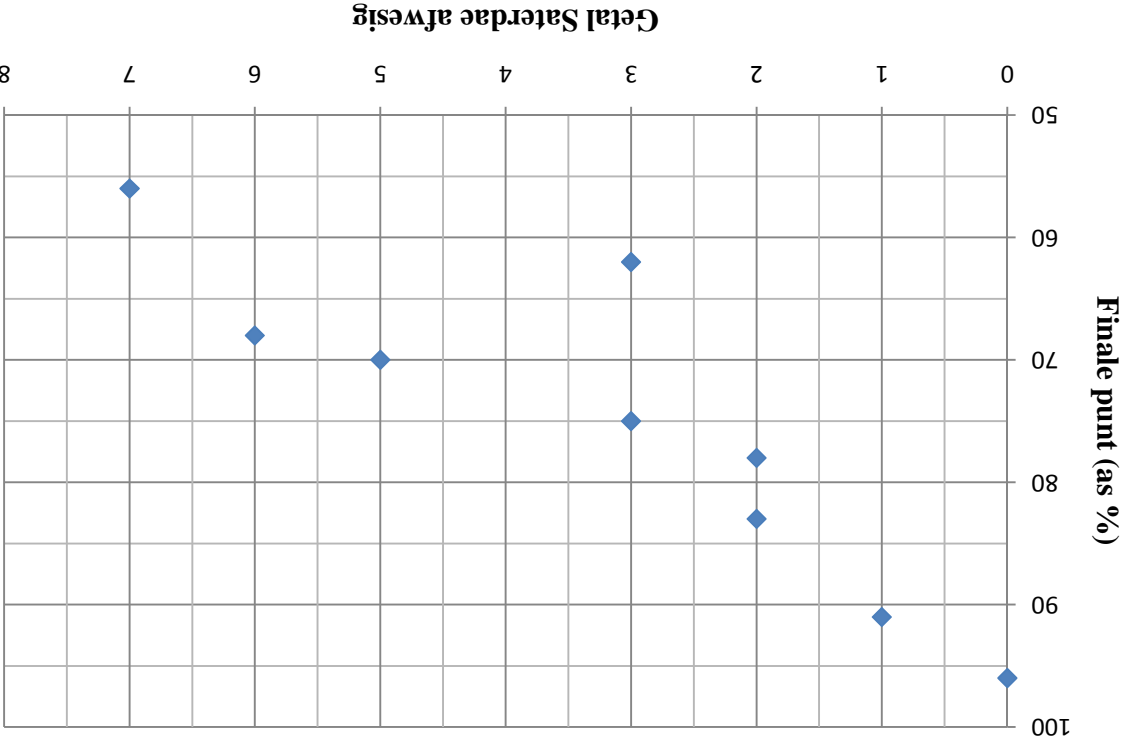


VRAAG 4

'n Groep studente het 'n kursus in Statistiek op Saterdag oor 'n tydperk van 10 maande bygewoon. Die getal Saterdagae waarop 'n student afwesig was, is teenoor die finale punt wat die student behaal het, opgeteken. Die inligting word in die tabel hieronder getoon en die spreidiagram vir die data is geteken.

Getal Saterdagae afwesig	Finale punt (as %)
0	96
1	91
2	78
2	83
3	75
3	62
5	70
6	68
7	56

SPREIDIAGRAM WAT DIE GETAL SATERDAE AFWESIG EN DIE FINALE PUNT BEHAAL, AANTOON



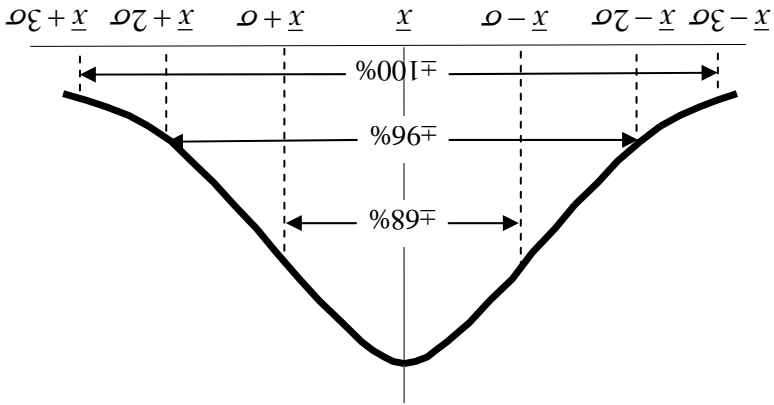
- 4.1 Bereken die vergelyking van die kleinstekwadrate-regressielyn.
- (4)
- 4.2 Teken die kleinstekwadrate-regressielyn op die rooster voorsien op DIAGRAMVEL 1.
- (2)
- 4.3 Bereken die korrelasiekoëffisiënt.
- (2)
- 4.4 Lewer kommentaar op die tendens van die data.
- (2)
- 4.5 Voorspel die finale punt van 'n student wat vir vier Saterdagae afwesig was.
- (2)

[12]



VRAAG 3

Die getal SMS-boodskappe wat deur 'n groep tieners gestuur is, is oor 'n tydperk van 'n week aangeteken. Daar is gevind dat die data normaal versprei is met 'n gemiddeld van 140 boodskappe en 'n standaardafwyking van 12 boodskappe.



Beantwoord die volgende vrae met verwysing na die inligting verskaf in die grafiek:

3.1 Watter persentasie tieners het minder as 128 boodskappe gestuur? (3)

3.2 Watter persentasie tieners het tussen 116 en 152 boodskappe gestuur? (3)

[6]



VRAAG 1

Die eerste VIER terme van 'n getally is 2; 5; 10 en 17.

1.1 Skryf die volgende TWEE terme in die ry neer.

1.2 Skryf 'n rekursiewe formule vir die ry neer.

VRAAG 2

'n Groot maatskappy neem verskeie persone in diens. Die tabel hieronder toon die getal persone wat in elke posisie aangestel is en die maandelikse salaris wat elke persoon in daardie posisie verdien.

POSISIE	GETAL IN POSISIE IN DIENS GENEEM	MAANDELIKSE SALARIS PER PERSOON (IN RAND)
Besturende direkteur	1	150 000
Direkteur	2	100 000
Bestuurder	2	75 000
Voorman	5	15 000
Geskoolde werkers	30	10 000
Halfgeskoolde werkers	40	7 500
Ongeskoolde werkers	65	6 000
Administrasie	5	5 000

2.1 Bereken die getal persone wat by hierdie maatskappy in diens geneem is.

2.2 Bereken die totale bedrag benodig om salarisse vir EEN maand te betaal.

2.3 Bepaal die gemiddelde maandelikse salaris vir 'n werknemer in hierdie maatskappy.

2.4 Is die gemiddelde maandelikse salaris bereken in VRAAG 2.3 'n goeie aanduiding van 'n werknemer se maandelikse salaris? Motiveer jou antwoord.

[7]



INSTRUKSIES EN INLIGTING

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

1. Hierdie vraestel bestaan uit 11 vrae.
2. Beantwoord AL die vrae.
3. Dui ALLE berekeninge, diagramme, grafieke, ensovoorts wat jy in die bepaling van jou antwoorde gebruik het, duidelik aan.
4. Volpunte sal nie noodwendig aan antwoorde alleen toegeken word nie.
5. Jy mag 'n goedgekeurde wetenskaplike sakrekenaar (nie-programmeerbaar en nie-grafies) gebruik, tensy anders vermeld.
6. Rond jou antwoorde tot TWEDE desimale plekke af, tensy anders vermeld.
7. Diagramme is NIE noodwendig volgens skaal geteken NIE.
8. DRIE diagramme vir die beantwoording van VRAAG 4.2, VRAAG 8, VRAAG 9, VRAAG 10, VRAAG 11.1 en VRAAG 11.2 is aan die einde van hierdie vraestel aangeheg. Skryf jou sentrumnommer en eksamenommer op hierdie bladsye in die ruimtes voorsien en plaas die bladsye agter in jou ANTWOORDEBOEK.
9. 'n Inligtingsblad, met formules, is aan die einde van die vraestel ingesluit.
10. Nommer die antwoorde korrek volgens die nommeringstelsel wat in hierdie vraestel gebruik is.
11. Skryf netjies en leesbaar.





basic education
Department:
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REPUBLIC OF SOUTH AFRICA

**NASIONALE
SENIOR SERTIFIKAT**

GRAAD 12

**WISKUNDE V3
FEBRUARIE/MAART 2012**

PUNTE: 100

TYD: 2 uur



Hierdie vraestel bestaan uit 11 bladsye, 3 diagramme en 1 inligtingsblad.



Kopiereg voorbehou

Blaai om asseblief