



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

MATHEMATICS P3

EXEMPLAR 2007

MARKS: 100

TIME: 2 hours

This question paper consists of 8 pages, 1 diagram sheet and a 2-page formula sheet.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions:

1. This question paper consists of 8 questions. Answer ALL the questions.
2. Some of the questions have to be answered on the attached diagram sheet. Write your name/examination number in the space provided and hand in the diagram sheet with your answer book.
3. Clearly show ALL calculations, diagrams, graphs, et cetera you have used in determining the answers.
4. An approved scientific calculator (non-programmable and non-graphical) may be used, unless stated otherwise.
5. If necessary, answers should be rounded off to TWO decimal places, unless stated otherwise.
6. Number the answers correctly according to the numbering system used in this question paper.
7. Diagrams are NOT necessarily drawn to scale.
8. It is in your own interest to write legibly and to present the work neatly.

QUESTION 1

1.1 The probability that event A will occur, is 0,2 and the probability that event B will occur, is 0,6. The probability that both events A and B will occur, is 0,12.

1.1.1 Are events A and B mutually exclusive? Explain your answer. (2)

1.1.2 Are events A and B independent? Explain your answer. (2)

1.2 A survey was conducted about the broadcasting of a certain television programme. 150 males and 100 females were interviewed. The table below shows some of the results:

	MALE	FEMALE	TOTAL
Liked the programme	60	(a)	130
Did not like the programme	(b)	30	(c)
TOTAL	150	100	(d)

1.2.1 Calculate the values of the letters (a, b, c and d) in the table. (4)

1.2.2 Is a person's preference for the programme independent of the person's gender? Support your answer with appropriate calculations. (4)
[12]

QUESTION 2

Zama is planning on spending the evening with her friends. She is undecided about what she should wear. She has to choose from the following items that she placed on her bed:

Two pairs of pants: blue jeans or white pants

Three tops: a white T-shirt, a red T-shirt or a blue shirt

Two pairs of shoes: a black pair or a white pair

2.1 Draw a tree diagram to show ALL the possible combinations of pants, tops and shoes. (6)

2.2 Each pair of pants, each top and each pair of shoes have an equal chance of being chosen. Zama chooses her outfit at random.

2.2.1 What is the probability that Zama will wear her blue jeans and black shoes? (2)

2.2.2 What is the probability that she will wear a red T-shirt and white shoes? (2)
[10]

QUESTION 3

At the National School of the Arts there are 200 learners in Grade 11. Learners completed their registration forms and the following information was extracted:

- 107 learners take Art
- 90 learners take Dance
- 63 learners take Graphic Design
- 35 learners take Dance and Art
- 23 learners take Art and Graphic Design
- 15 learners take Art and Dance and Graphic Design
- 190 learners take Art or Dance or Graphic Design
- x learners take Graphic Design and Dance, but NOT Art

- 3.1 Draw a Venn diagram to represent the given information. (Let D = Dance; A = Art and G = Graphic Design.) (8)
- 3.2 How many learners have NOT registered for any of Art or Dance or Graphic Design? (1)
- 3.3 How many learners have registered for Graphic Design and Dance, but NOT Art? (3)
- 3.4 What is the probability that a Grade 11 learner selected at random has registered for at least two of the following subjects: Art, Dance or Graphic Design? (Indicate your answer correct to THREE decimal places.) (4)
- [16]**

QUESTION 4

Mabayana Boys' School has a student population of 1 200. Fifty boys were selected at random and interviewed about their favourite sport. The table below shows the preferences of these 50 boys:

SPORT	PREFERENCES
Soccer	20
Rugby	7
Cricket	10
Golf	5
Hockey	8

- 4.1 Use the information above to predict the total number of boys who prefer soccer at Mabayana Boys' School. (2)
- 4.2 Is the prediction accurate? Give a reason for your answer. (3)
- [5]**

QUESTION 5

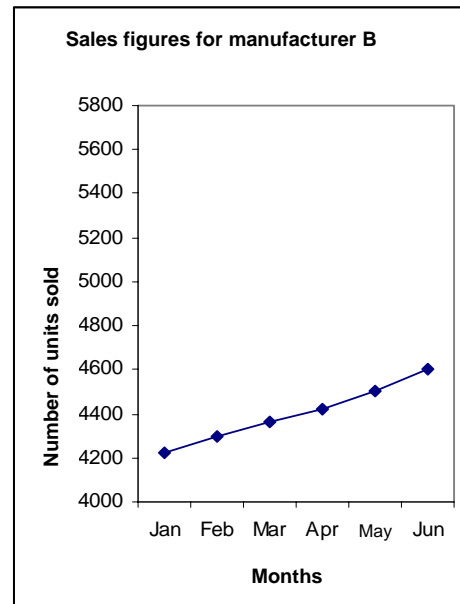
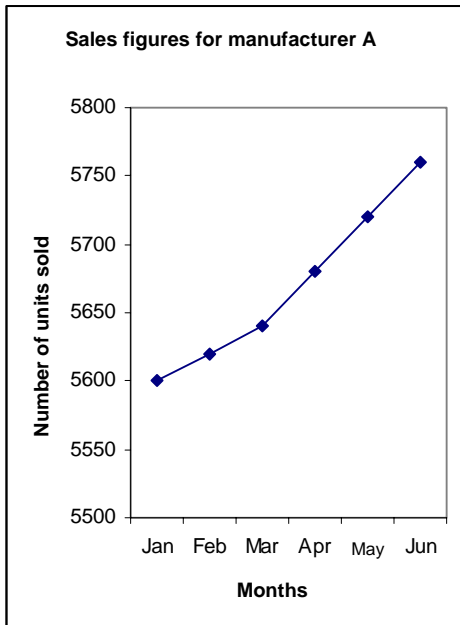
The sales figures of two motor manufacturers in South Africa for a six-month period were released. The number of vehicles sold by these two manufacturers is shown below:

MONTH	January	February	March	April	May	June
Sales for manufacturer A	5 600	5 620	5 640	5 680	5 720	5 760
Sales for manufacturer B	4 200	4 300	4 360	4 420	4 500	4 600



5.1 Refer to the table above and determine which manufacturer had a better growth rate in sales over the given period. (5)

5.2 The information below regarding the car sales was presented by two line graphs:



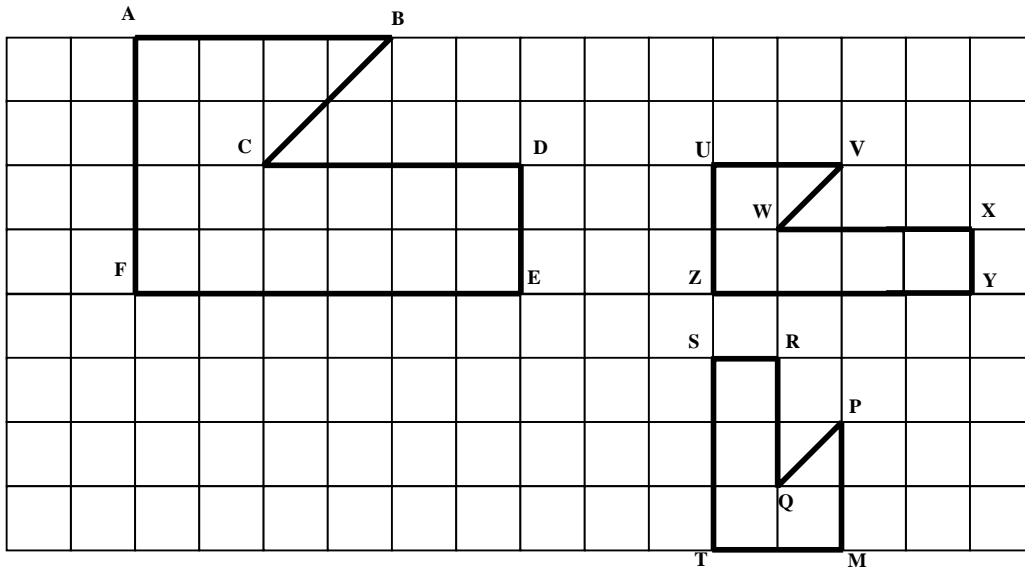
5.2.1 Determine, with the aid of the graphs above, which manufacturer gives the impression of a higher growth rate in sales over the given period. (2)

5.2.2 Explain how this perception is created. (2)
[9]

QUESTION 6

6.1 Erin draws the figures ABCDEF, UVWXYZ and MPQRST on the square grid below and shows them to her friend, Saras. Saras says that UVWXYZ is similar to ABCDEF, but MPQRST is not similar to ABCDEF.

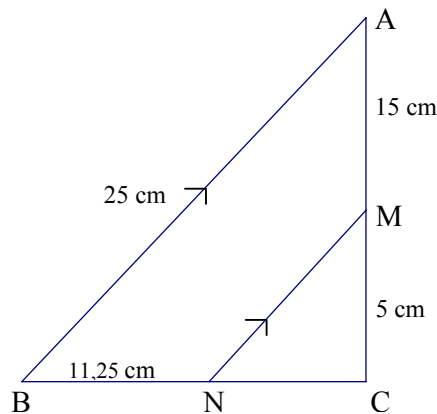
Do you agree with Saras? Give reasons why you agree or disagree with Saras.



(4)

6.2 The diagram below has ΔABC with:

$BN = 11,25$ cm, $AB = 25$ cm, $MC = 5$ cm, $AM = 15$ cm and $AB \parallel MN$



6.2.1 Calculate NC. (4)

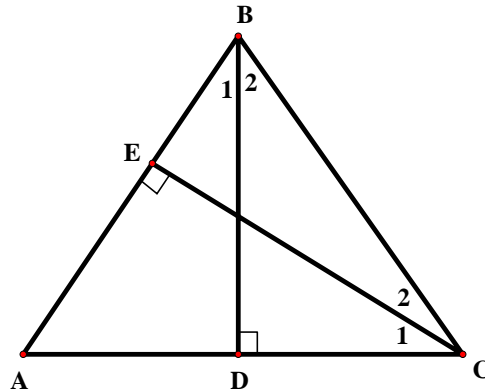
6.2.2 Calculate MN. (4)

6.2.3 Prove that ΔABC is a right-angle triangle. (3)

[15]

QUESTION 7

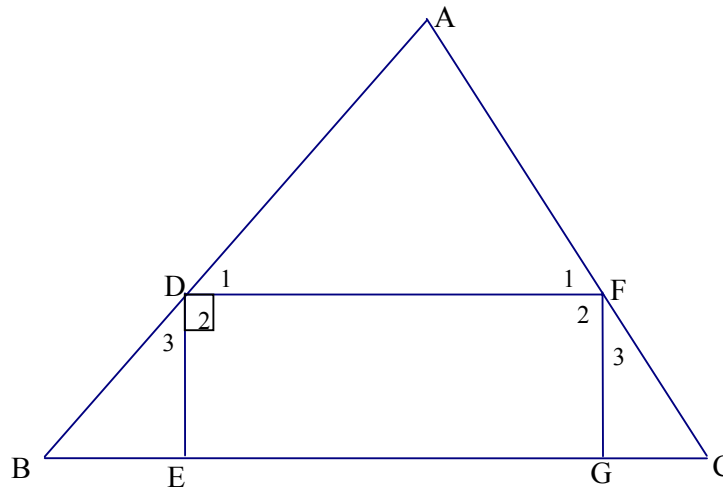
7.1 In the isosceles triangle below, $AB = BC$, $CE \perp AB$ and $BD \perp AC$.



7.1.1 Prove that $\triangle AEC \cong \triangle CDB$. (4)

7.1.2 Prove that $AE \times BD = DC \times CE$. (3)

7.2 Given rectangle $DEGF$ such that D is on AB and F is on AC of $\triangle ABC$ and $AD:DB = 2:1$.



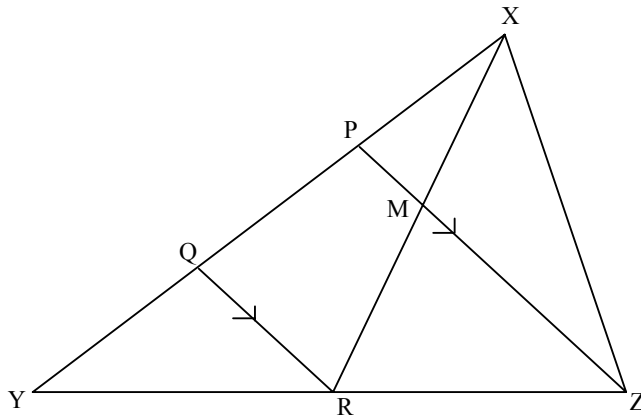
Answer the following, giving reasons for ALL statements:

7.2.1 Determine $\frac{AF}{AC}$. (3)

7.2.2 Prove that $\triangle ADF \cong \triangle ABC$. (6)

7.2.3 If $EG = 8$ cm, calculate the length of BC . (6)

[22]

QUESTION 8

In the figure above, R is the midpoint of YZ of $\triangle XYZ$. If $PX = \frac{1}{3}XY$ and $QY = 4$ cm, determine with reasons the numerical value of the following:

8.1 $\frac{PY}{YX}$ (3)

8.2 $\frac{\text{Area of } \triangle XQR}{\text{Area of } \triangle XYR}$ (3)

8.3 $\frac{\text{Area of } \triangle XMZ}{\text{Area of } \triangle XYZ}$ (5)

[11]

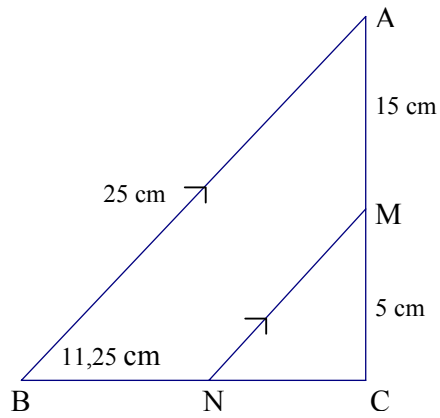
TOTAL: 100

NAME/EXAMINATION NUMBER:

DIAGRAM SHEET

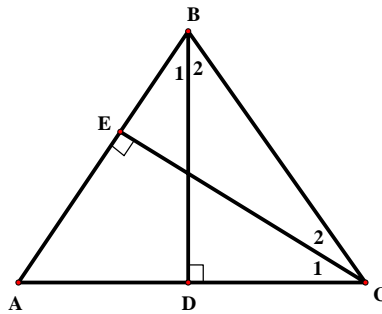
QUESTION 6

6.2

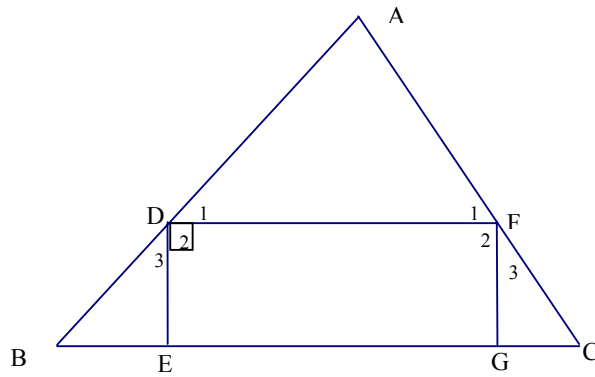


QUESTION 7

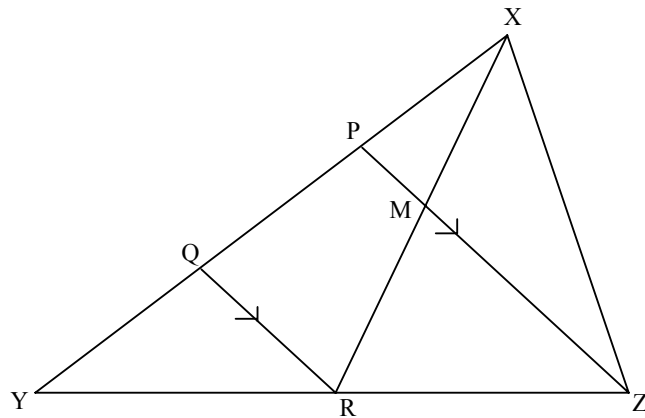
7.1



7.2



QUESTION 8



INFORMATION SHEET: MATHEMATICS
INLIGTINGSBLAD: WISKUNDE

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

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

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

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

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

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

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

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

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

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

$$y = mx + c$$

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

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

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

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

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

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

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

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

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

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

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

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

$$\sum_{i=1}^{\infty} ar^{i-1} = \frac{a}{1-r} ; \quad -1 < r < 1$$

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

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

$$m = \tan \theta$$

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

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

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

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

$$\text{s.d} = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}}$$

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

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

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

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