education

**Department:
Education
REPUBLIC OF SOUTH AFRICA**

NATIONAL
SENIOR CERTIFICATE

GRADE 10

MATHEMATICS P2

NOVEMBER 2006

MARKS: 100

TIME: 2 hours

This question paper consists of 9 pages.

Graph paper should be provided to candidates.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions:

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

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

3.   An approved scientific 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 correctly according to the numbering system used in this question paper.

6.   Diagrams are NOT necessarily drawn to scale.

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

QUESTION 1

1.1   ΔABC has co-ordinates A (–2 ; –2), B (1 ; 3) and C (6 ; 0).

    1.1.1   Determine the length of:

        (a)   AB   (3)
        (b)   BC   (2)
        (c)   AC   (2)

    1.1.2   Show that ΔABC is a right-angled triangle.   (3)

    1.1.3   If E is the midpoint of AB and D is the midpoint of AC, show that DE ‖ BC.   (8)

1.2   The line segment joining the points A $(x ; y)$ and B (3 ; - 5) is perpendicular to CD, whose gradient is $\dfrac{3}{4}$. Express x in terms of y.   (5)

[23]

QUESTION 2

The vertices of the figure in the diagram below has co-ordinates A (–6 ; 2), B (–6 ; 4), C (–4 ; 4), D (–4 ; 5), E (–2 ; 5) and F (–2 ; 2).
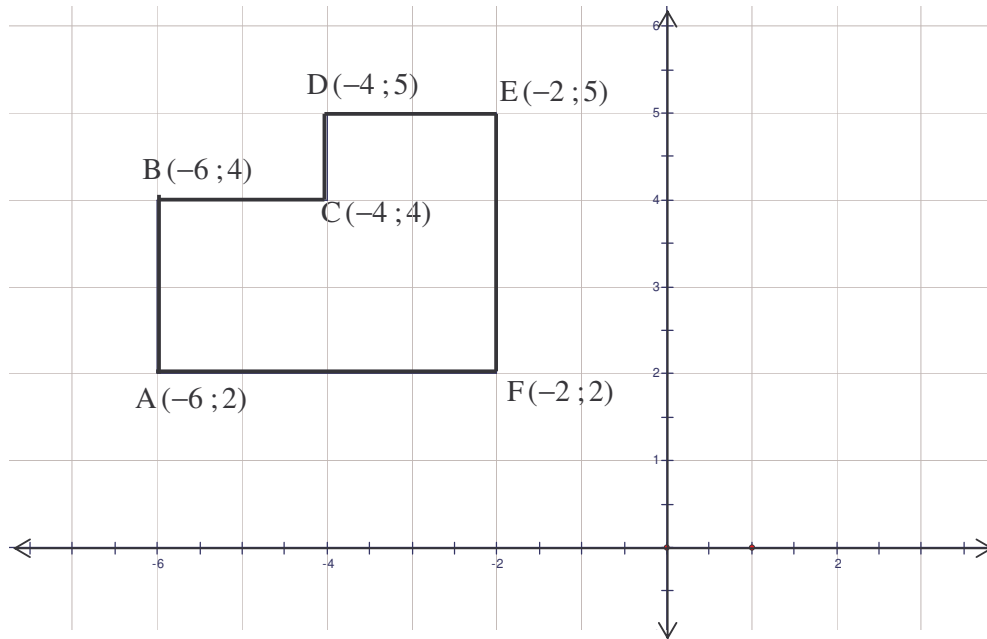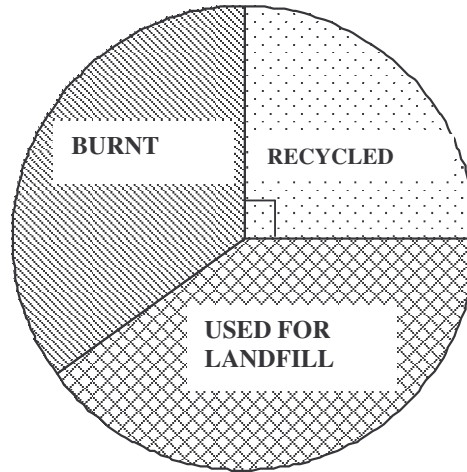

Determine the co-ordinates of A′, C′ and F′, in each case, if the following transformations are applied to ABCDEF:

2.1   Translate ABCDEF 6 units downwards and 5 units to the right   (6)

2.2   Reflect ABCDEF about the y–axis   (3)

2.3   Reflect ABCDEF about the line $y = x$ (6)
                                                                                                                        [15]

QUESTION 3

3.1 The pie chart below shows how the Tshwane Municipality disposes of its waste material.

3.1.1 Write down the fraction of the waste that is recycled. (1)

3.1.2 $\dfrac{2}{5}$ of waste is burnt.

Calculate the angle of the sector on the pie graph that represents the waste material that is burnt. (2)

3.1.3 Calculate the percentage of the total waste that is used for landfill. (4)

3.2   The data below shows the results (in percentage) of a mathematics test.

FREQUENCY TABLE

45 ; 76 ; 33 ; 49 ; 64 ; 42 ; 90 ; 83

24 ; 36 ; 80 ; 27 ; 36 ; 21 ; 49 ; 77

42 ; 55 ; 73 ; 88 ; 42 ; 29 ; 42 ; 46

53 ; 33 ; 66 ; 42 ; 91 ; 39 ; 54 ; 79

MARK INTERVAL	FREQUENCY
$20 \le$ mark < 30	
$30 \le$ mark < 40	
$40 \le$ mark < 50	
$50 \le$ mark < 60	
$60 \le$ mark < 70	
$70 \le$ mark < 80	
$80 \le$ mark < 90	
$90 \le$ mark < 100	

Consider the above-mentioned data and:

3.2.1   Copy and complete the frequency table in the answer book   (5)

3.2.2   Determine the mean   (2)

3.2.3   Determine the median   (2)

3.2.4   Determine the modal class   (2)

3.2.5   Use the frequency table in QUESTION 3.2.1 to draw a histogram on the
          graph paper provided   (5)
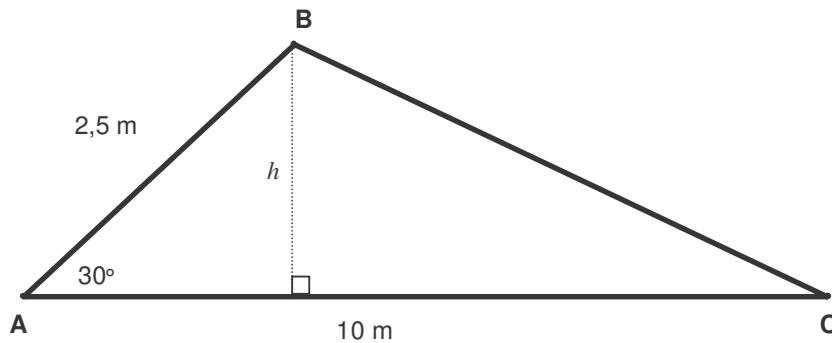
3.2.6   Construct the corresponding frequency polygon   (4)

[27]

QUESTION 4

4.1   In the diagram below AC = 5 centimetres, $\hat{A} = 63^o$ and $\hat{B} = 33^o$. CD $\perp$ AB.
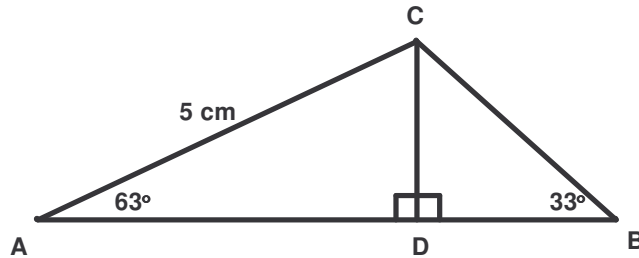
4.1.1   Calculate the value of CD, correct to TWO decimal places.   (3)

4.1.2   Calculate the length of AB, correct to TWO decimal places.   (7)

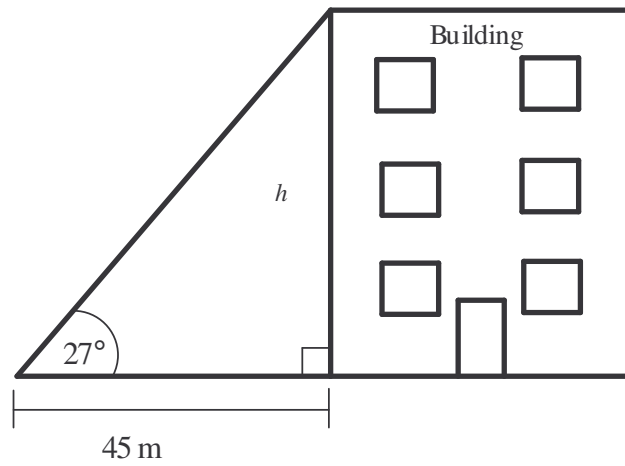4.2   In $\triangle$ABC below, $\hat{A} = 30^o$, AB = 2,5 metres and AC = 10 metres.

Use the fact that sin $30^o = 0,5$ and calculate the area of the triangle.

(4)

4.3   From a point on the ground the angle of elevation to the top of a building is 27°. The
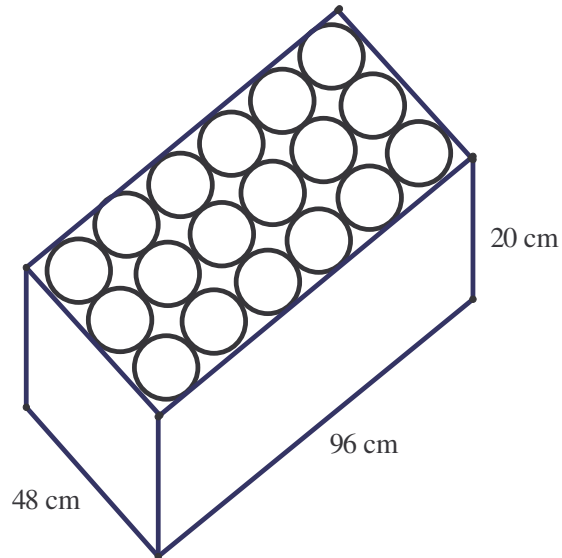   distance to the base of the building is 45 m.

       Calculate the height of the building, correct to ONE decimal place.

(4)
[18]

QUESTION 5

The picture below shows an open cardboard box having length, 96 cm, width, 48 cm and height, 20 cm. The box contains 18 cans of jam. The height of the jam can is 20 cm.

5.1 Calculate the total surface area of the box. (6)

5.2 What is the radius of each can? Show ALL calculations. (3)

5.3 What volume of the box do the cans occupy? (4)

5.4 Hence, determine the unused volume of the box. (4)

[17]

TOTAL: 100