



**education**

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Department:  
Education  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 10**

**MATHEMATICS P2**

**EXEMPLAR PAPER - 2006**

**MARKS: 100**

**TIME: 2 hours**

**This question paper consists of 9 pages.**

**Graph paper should be provided to the candidates.**

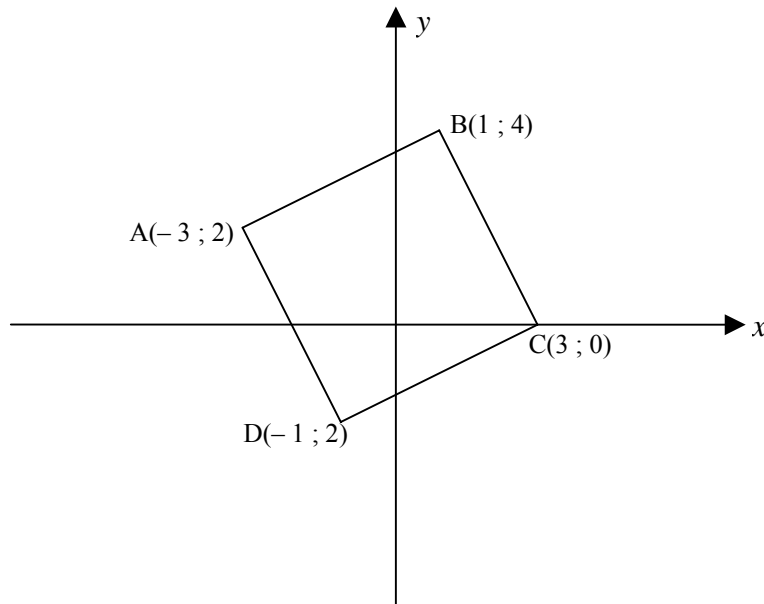
**INSTRUCTIONS AND INFORMATION**

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:

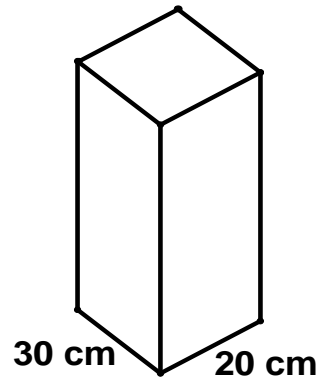


- 1.1 Calculate the following:
- 1.1.1 The gradients of AB and DC (5)
  - 1.1.2 The lengths of AB and DC (5)
  - 1.1.3 The gradients of AC and BD (4)
- 1.2 What special shape does the quadrilateral ABCD represent? Give a reason for your answer. (3)
- [17]

**QUESTION 2**

- 2.1 A mechanic uses  $36\,000\text{ cm}^3$  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)

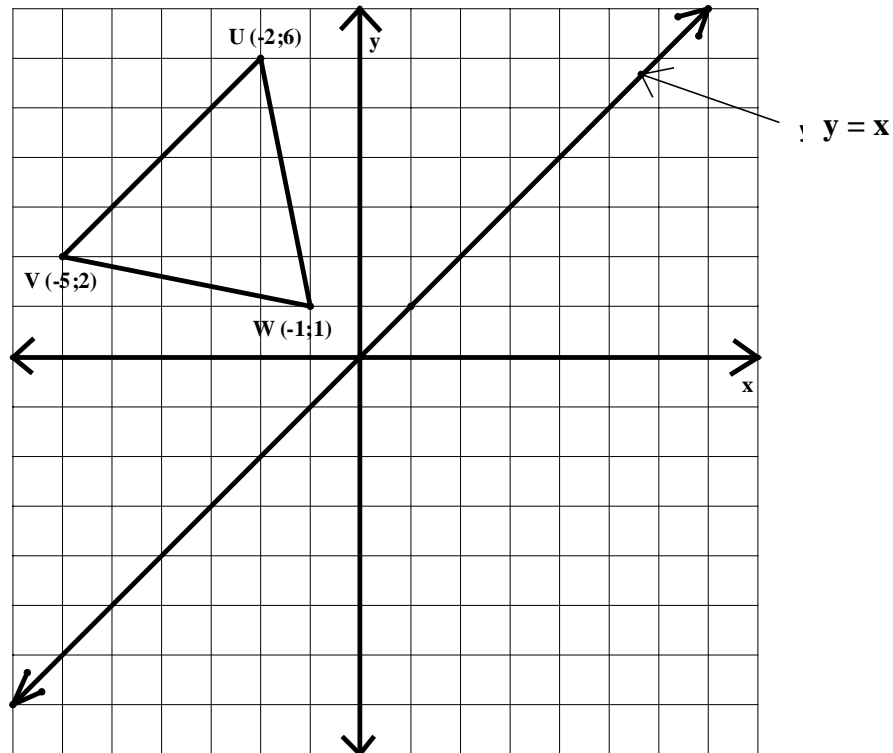
- 3.2 A (0 ; 4), B (-4 ; 0), C (-1 ; -1) and D (3 ; 3) are the co-ordinates of the vertices of a parallelogram ABCD in a Cartesian plane.

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)

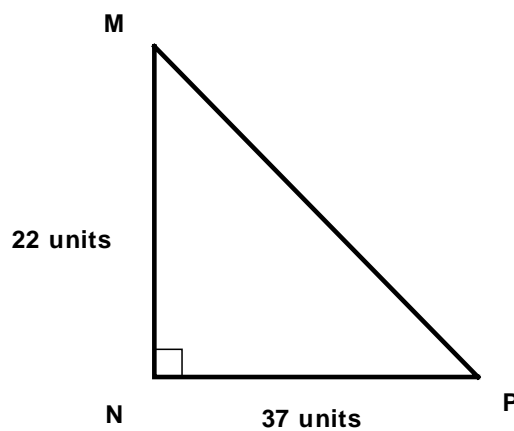
- 3.3 In the diagram below,  $\Delta UVW$  has co-ordinates  $U (-2 ; 6)$ ,  $V (-5 ; 2)$  and  $W (-1 ; 1)$ . If  $\Delta UVW$  is reflected along the line  $y = x$ , draw  $\Delta U'V'W'$  (on the grid provided) and write down the co-ordinates of  $U'$ ,  $V'$  and  $W'$ .



(6)  
[25]

**QUESTION 4**

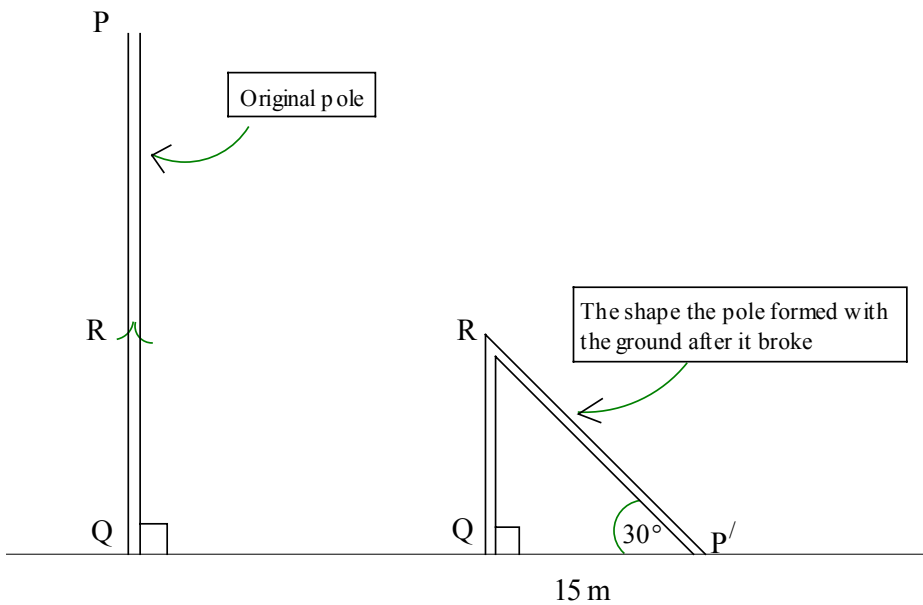
- 4.1 In  $\Delta MNP$ ,  $MN = 22$  units,  $\hat{N} = 90^\circ$  and  $NP = 37$  units. Determine  $\hat{P}$  (correct to ONE decimal place).



(3)

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

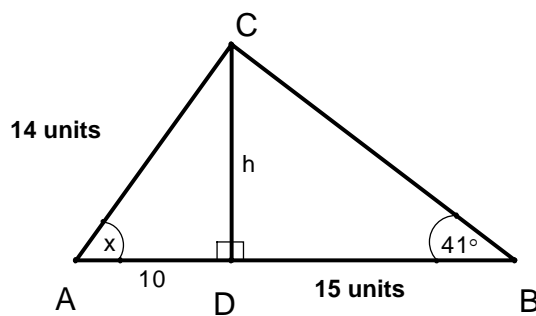
Calculate the original height PQ of the pole (correct to ONE decimal place).



(5)  
[8]

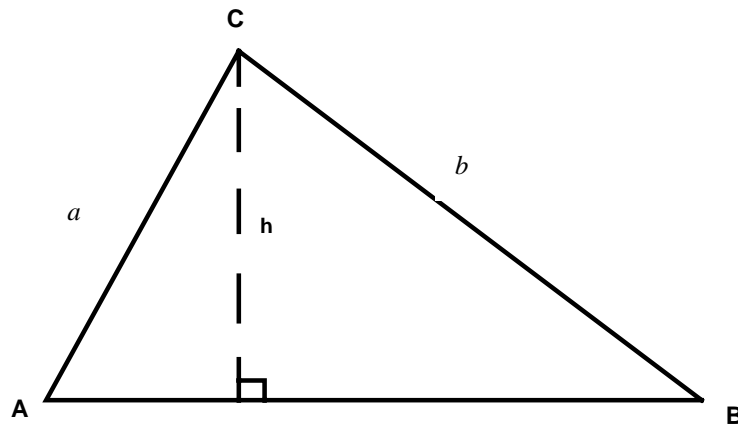
**QUESTION 5**

- 5.1 In  $\triangle ABC$ ,  $CD \perp AB$ ,  $\hat{A} = x$ ,  $\hat{B} = 41^\circ$ ,  $AD = 14$  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  $\triangle ABC$ ,  $BD \perp AC$ ,  $BD = h$  units,  $AB = c$  units,  $AC = b$  units and  $BC = a$  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,  $\hat{B} = 40^\circ$  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<br>(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 ( $^{\circ}\text{C}$ ) 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 Copy and complete the grouped frequency table below.

| Temperature in $^{\circ}\text{C}$ (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**