



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 11**

**MATHEMATICS – THIRD PAPER  
NOVEMBER 2009**

**MARKS: 100**

**TIME: 2 hours**

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This question paper consists of 9 pages, a diagram sheet and a formula sheet.

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**INSTRUCTIONS AND INFORMATION**

Read the following instructions carefully before answering the questions.

1. This question paper consists of EIGHT questions. Answer ALL the questions.
2. Show clearly ALL calculations, diagrams, graphs, and et cetera which 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 legibly and to present the work neatly.
8. An information sheet with formulae is attached.

**QUESTION 1**

1.1 Due to the current economic downturn, there is speculation that jobs will be lost in the business sector. The probability that jobs will be lost in the production section only is 50%, in the management section only, 5% and in both production and management together, 20%.

1.1.1 What is the probability that no jobs will be lost? (2)

1.1.2 Are the job losses in production and management mutually exclusive? Give a reason. (2)

1.2 120 workers at the end of their first year were rated either worthy of a permanent appointment or not worthy of a permanent appointment. All 120 workers qualified at either production line A or production line B. The results are summarised in the table below.

	Worthy of Permanent appointment	Not Worthy of Permanent appointment	TOTAL
Production line A	60	a	65
Production line B	e	5	d
TOTAL	f	b	c

1.2.1 Calculate the values of (a, b, c, d, e and f) in the table. (3)

1.2.2 Is a worker's permanent appointment dependent on the production line they work on? Support your answer with calculations. (4)

**[11]****QUESTION 2**

A tuck shop at a company offers a limited number of choices of meals.  
(NOTE: A meal consists of one item from each group, shown below.)

**Fast food : Burgers(B), Hotdogs(H), Pies(P)**  
**Beverages : Tea(T), Fruit juice(F)**  
**Snacks : Chips(C), Sweets(S)**

2.1 Draw a tree diagram to present all possible combinations of meals. (6)

2.2 How many different combinations are there? (1)

2.3 What is the probability that a worker will buy a Burger and a Fruit juice? (2)

**[9]**

**QUESTION 3**

A study was done, amongst eighty workers in a company, to investigate leave patterns in a three year cycle. The following results were obtained:

40 applied for sick leave(**SK**)

35 applied for family responsibility leave(**FR**)

40 applied for study leave(**ST**)

21 applied for both sick leave(**SK**) and study leave(**ST**)

18 applied for family responsibility leave(**FR**) and study leave(**ST**)

68 applied for at least one of the three types of leave.

7 applied for all three types of leave.

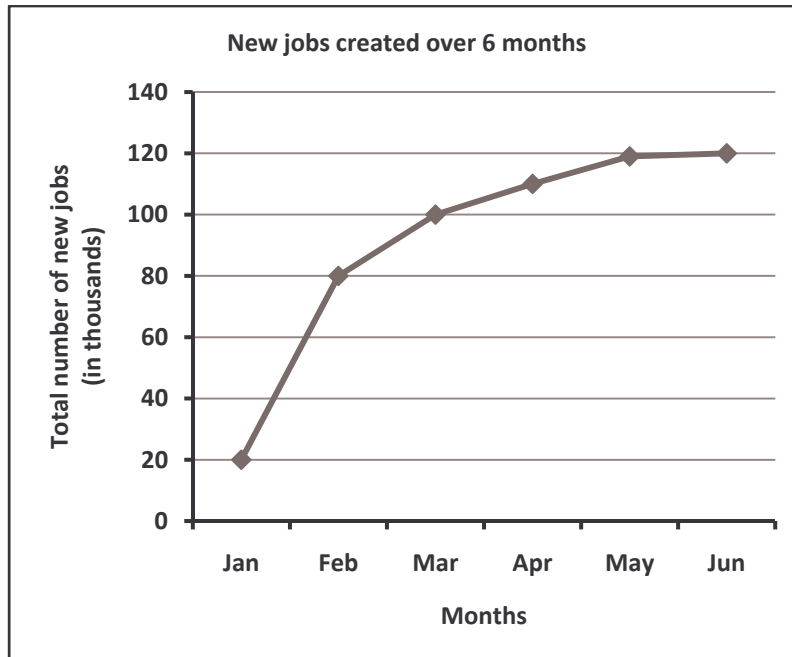
3.1 Represent this information in a Venn diagram. (8)

3.2 How many workers did not apply for any of the three types of leave? (1)

3.3 How many workers took sick leave and family responsibility leave, but not study leave? (3)  
[12]

**QUESTION 4**

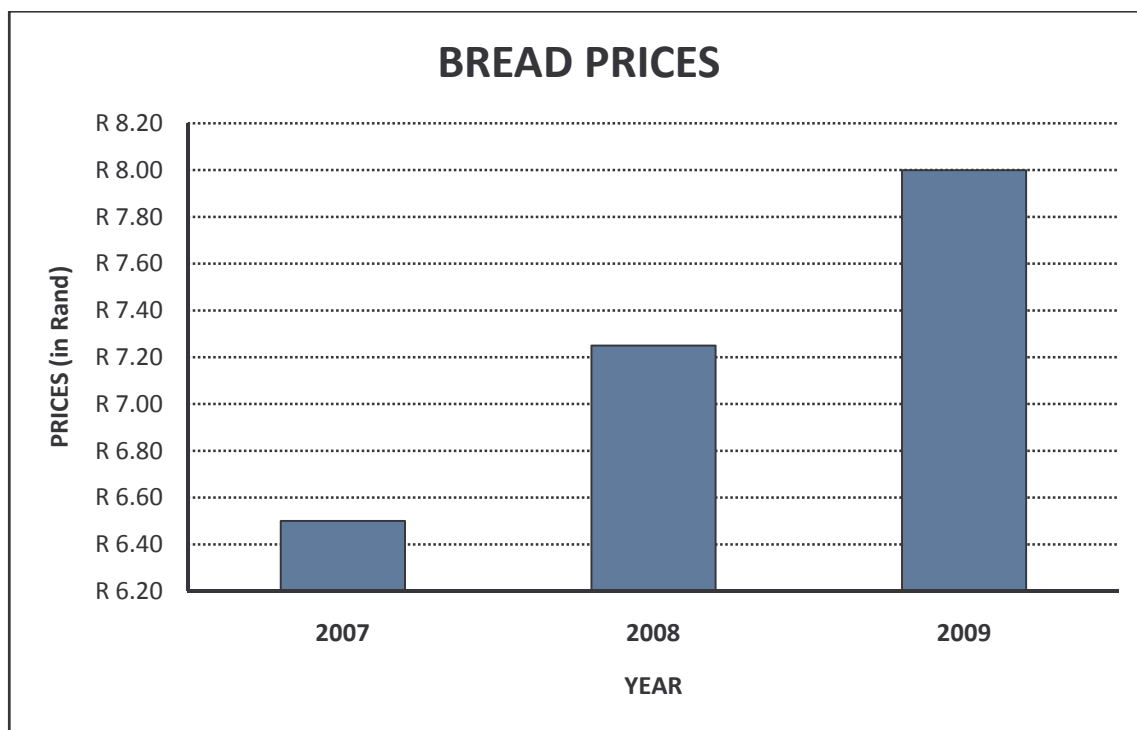
4.1 The graph below shows the number of new jobs created over a period of 6 months(January to June).



4.1.1 How many new jobs were created between January and March? (1)

4.1.2 The graph above shows a spectacular increase in the number of new jobs created from January to June. Do you agree with the statement? Motivate your answer. (3)

4.2 The graph below shows the increase of the price of bread in a three year cycle.



4.2.1 If the increase of the price of bread is consistent for the next two years, what will the price of bread be in 2011? (1)

4.2.2 The graph above misleads the consumers. Explain why. (2)

4.3 The following information regarding the marks achieved by a grade 11 class in a test is given:

**minimum mark = 14 ; lower quartile = 40 ; median = 51 ; upper quartile = 70 ; maximum mark = 92**

4.3.1 Calculate the inter-quartile range. (1)

4.3.2 Is the distribution of marks symmetrical, skewed to the left, or skewed to the right? (1)

4.3.3 How does the number of candidates who achieve marks greater than the median, compare to the number of those who achieve marks less than the median? (1)

4.3.4 If 40 marks are required to pass, what percentage of the class passed? (1)

4.3.5 The grade 12 class write the same test. The median for their marks is 55 and the inter-quartile range is 24. For which class do the marks deviate less from the median? Motivate your answer. (2)

**QUESTION 5**

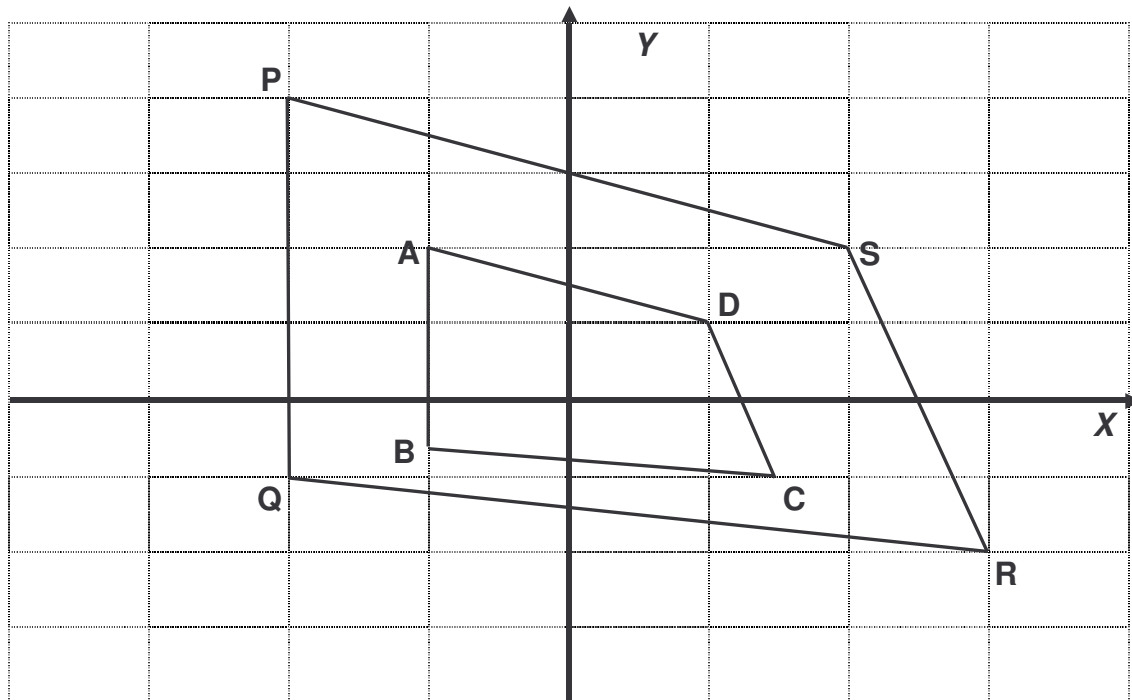
A survey was conducted amongst all 2 000 workers in a company about their choice of area of development. The responses of 60 workers were selected at random. The table below shows the results obtained.

Development Area	Number
Computer Literacy	22
Management	12
Human Relations	9
Legal Issues	7
Other	10
TOTAL	60

- 5.1 Predict the total number of workers at the company who would prefer to do a management course. (2)
- 5.2 Is your prediction likely to be reliable? Motivate your answer. (3)  
[5]

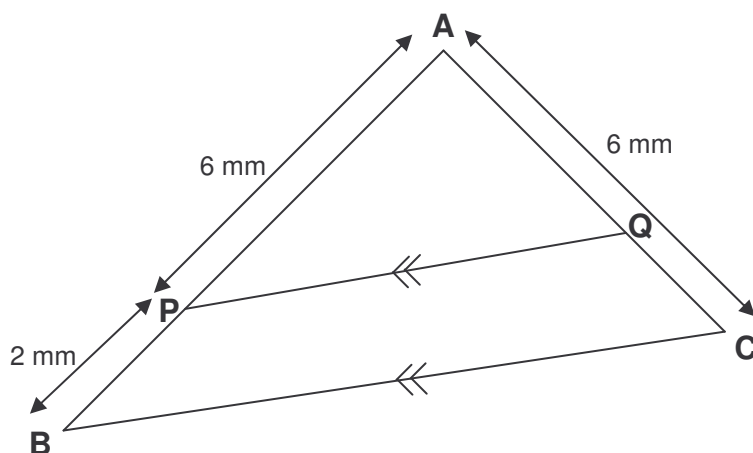
**QUESTION 6**

- 6.1 Refer to the diagram below and answer the question that follow.



- Is PQRS similar to ABCD? Give a reason. (2)

6.2 In  $\triangle ABC$ , PQ is drawn parallel to BC. AP = 6 mm, PB = 2 mm and AC = 6 mm.



6.2.1 Determine the length of QC. (4)

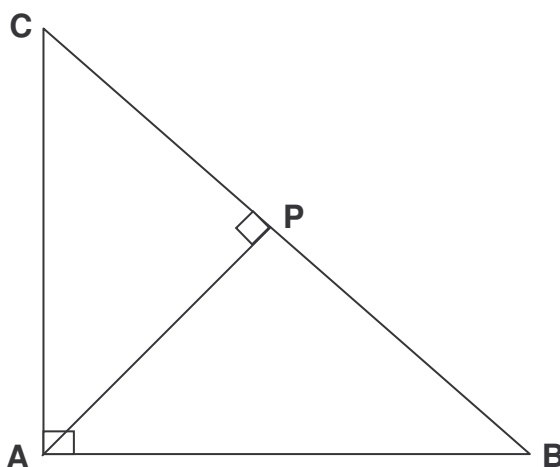
6.2.2 Determine the length of BC, if PQ = 7,5 mm. (4)

6.2.3 Hence, deduce that  $\triangle ABC$  is a right-angled triangle. (3)

[13]

**QUESTION 7**

7.1 In the figure below  $AP \perp CB$  and  $CA \perp AB$ .



7.1.1 Prove that  $\triangle ABP \sim \triangle CBA$ . (3)

7.1.2 Hence, prove that  $AB \times CA = AP \times CB$ . (3)