GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION

PROVINCIAL EXAMINATION

NOVEMBER 2016

GRADE 9

MATHEMATICS

MARKS: 120
TIME: 2 hours

12 pages, 1 formula sheet and 2 answer sheets

* I 5 *

P.T.O.

GAUTENG DEPARTMENT OF EDUCATION

PROVINCIAL EXAMINATION

MATHEMATICS

MARKS: 120
TIME: 2 hours

INSTRUCTIONS AND INFORMATION

1. This question paper consists of SECTION A and SECTION B based on the prescribed content framework in the CAPS document.

   SECTION A: MULTIPLE-CHOICE QUESTIONS

   QUESTION 1: Ten multiple-choice questions based on all five content areas
   Answer this section on the answer sheet provided.

   SECTION B: SEVEN QUESTIONS BASED ON FIVE CONTENT AREAS

   QUESTION 2: Numbers, operations and relations

   QUESTION 3: Patterns and algebra

   QUESTION 4: Algebra

   QUESTION 5: Functions

   QUESTION 6: Space and shapes

   QUESTION 7: Measurement

   QUESTION 8: Data handling

2. Answer ALL questions from both SECTIONS.

3. A non-programmable calculator may be used unless otherwise stated.

4. In SECTION A, **circle** the letter of the correct answer. If you change your decision cross out the circled letter and circle your new choice

5. In SECTION B, show all necessary steps in your working unless otherwise stated.

6. When answering questions, candidates must apply their knowledge, skills and insight.

7. Number the answers correctly according to the numbering system used in this question paper.

8. Write neatly and legibly.

SECTION A

QUESTION 1
ANSWER THIS QUESTION ON ANSWER SHEET A.

Circle the letter of the correct answer from the four possible answers.

1.1 Which of the following numbers is a rational number?

A $\sqrt{-4}$

B 0,141141114

C $\sqrt[3]{-8}$

D π (1)

1.2 Simplify $5{,}6 + 1{,}2 \times 3$

A 9,2

B 20,4

C 41,6

D 204 (1)

1.3 The next term in the sequence 1 ; 1 ; 1 ; 4 ; 1 ; 9 ; 1 ; … , is …

A 1.

B 16.

C 14.

D 10. (1)

1.4 Complete the statement: The expression $\frac{2x+5}{3} \times \frac{4x+1}{7}$ has … terms.

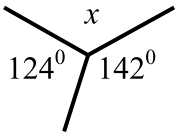
A 1

B 4

C 2

D 5 (1)

1.5 The value of x in the figure below is:



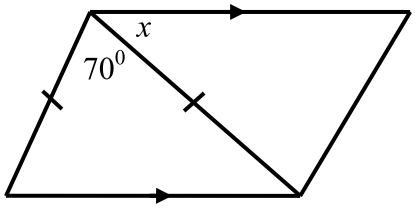
A 38^0

B 56^0

C 94^0

D 90^0 (1)

1.6 The value of x is:



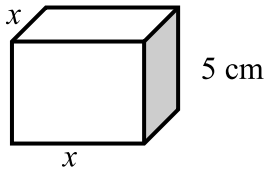
A 70^0

B 110^0

C 30^0

D 55^0 (1)

1.7 The volume of the given prism is:



A $5x^2cm^3$

B $5x^2cm^2$

C $10x\ cm^3$

D $(2x+5)cm^3$ (1)

1.8 If the perimeter of a square is 20 cm, then the area of the square is equal to:

A 400 cm^2

B 25 cm^2

C 5 cm^2

D 100 cm^2 (1)

1.9 The median of a set of data is the:

A Biggest number – smallest number

B Middle number

C Most common number

D Average of the data (1)

1.10 In how many ways can you arrange the four cards side by side as shown below?

A 32

B 24

C 16 (1)

D 8

[10]

SECTION B

QUESTION 2

2.1 An amount of R15 000 is invested for 5 years at compound interest of 8% per annum.

2.1.1 What is the total value of the investment after 1 year? (2)

2.1.2 Calculate the total value of the investment after 5 years. (3)

2.2 Calculate $\sqrt[3]{-64}+(-3)^2$ without using a calculator. (2)

2.3 A recipe needs $\frac{3}{4}$ cups of sugar, $1\frac{1}{2}$ cups of flour and a $\frac{1}{3}$ cup of milk.

Write the ratio of the ingredients in the simplest form. (2)

2.4 A large truck uses 16,5 litres of diesel per 100 kilometres. Calculate how much diesel the truck will need to travel 1 284 km. (3)

[12]

QUESTION 3

3.1 Study the pattern below and answer the questions that follow.

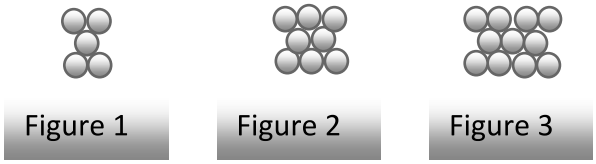


Figure 1 Figure 2 Figure 3

3.1.1 How many balls must be added to draw the next figure? (1)

3.1.2 Draw and complete the table in your answer book.

Figure	1	4	5
Number of balls	5		

(2)

3.1.3 Is the general rule $T_n = 3(n-1)+5$ correct to determine the number of balls for any figure in the pattern? Prove your answer by finding the general rule using the table above. (3)

3.2 Is the following statement correct? Show by calculation to prove your answer.

$(2x-1)^2 = 4x^2+1$ (2)

[8]

QUESTION 4

4.1 Subtract $4x^2-3$ from $-2(2x^2-3x+5)$ (3)

4.2 Simplify.

4.2.1 $-\frac{b^3}{12}(4b-\frac{2ab}{6}+12)$ (3)

4.2.2 $\frac{4x^3-2x(3x^2)}{2x^3}$ (3)

4.3 Factorise fully.

$x(a+y)-(y+a)$ (2)

4.4 Solve the following equations.

4.4.1 $2(x+2)-(x-3)=5$ (4)

4.4.2 $\frac{2x}{x+1}+\frac{2x}{1-x}=\frac{1}{x^2-1}$ (5)

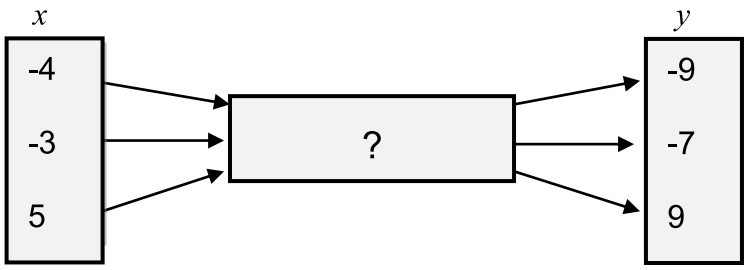
4.4.3 $10^x=0{,}0001$ (2)

4.5 The sum of three consecutive even numbers is 78. Determine the three numbers. (5)

[27]

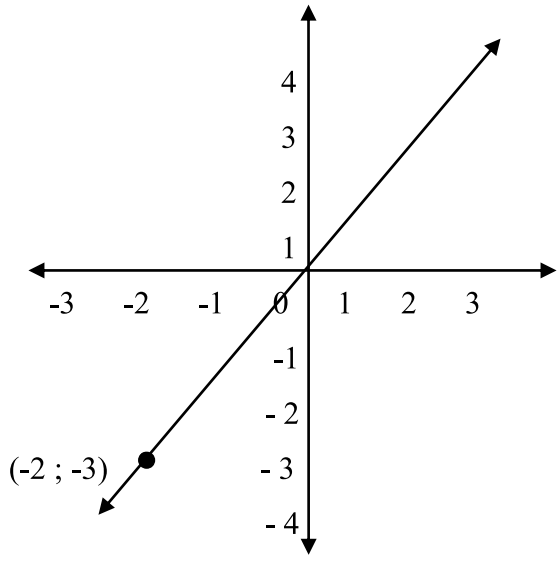
QUESTION 5

5.1 Determine the rule for the following flow diagram.



(2)

5.2 Calculate the gradient of a line through the points (0 ; 0) and (-2 ; -3).



(2)

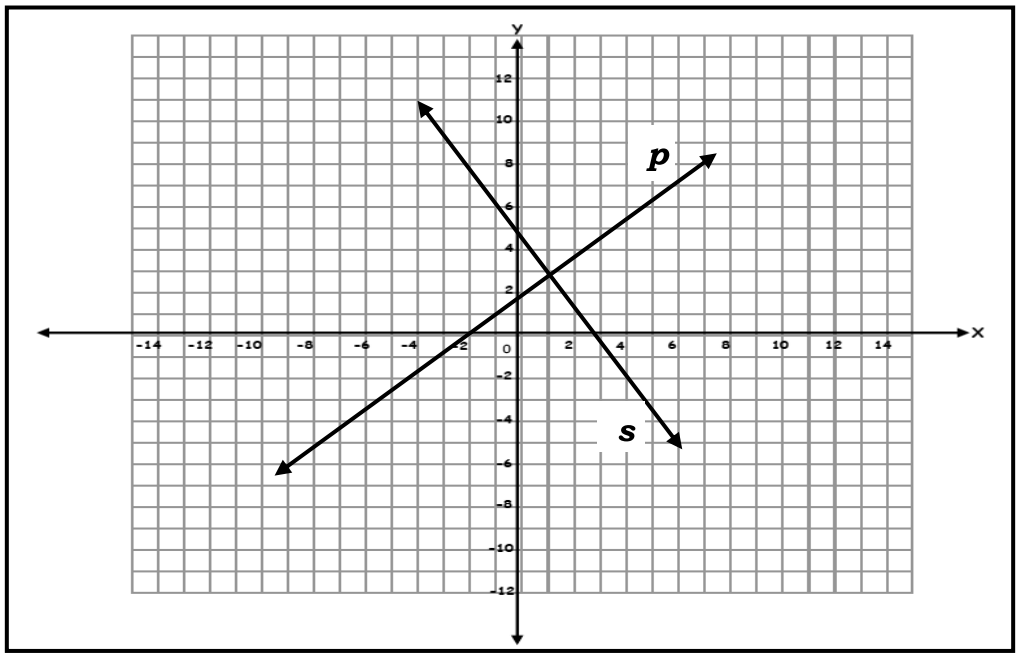
5.3 The equation $y-1=2(x-2)$ defines a straight line graph.

5.3.1 Write down the y-intercept of the graph. (1)

5.3.2 Calculate the x-intercept of the graph. (3)

5.3.3 Draw the graph in your answer book. (2)

5.4 Study the graph below and answer the questions that follow.



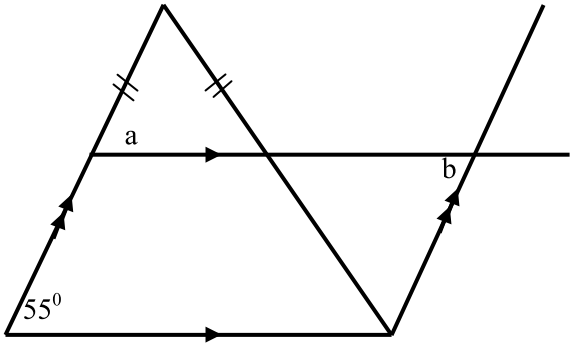
5.4.1 Which of the two graphs, ***p*** or ***s*** has a positive gradient? Explain. (2)

5.4.2 The equation of ***p*** is $y = x + 2$. If $p \perp s$ and the $y-$intercept of ***s*** is the point (0 ; 5), determine the equation of ***s***. (2)

[14]

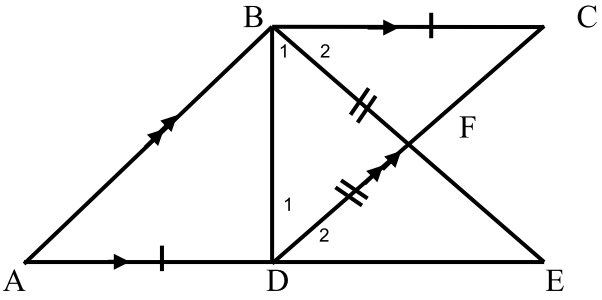
QUESTION 6

6.1 Determine with reasons, the sizes of angles a and b in the diagram below.



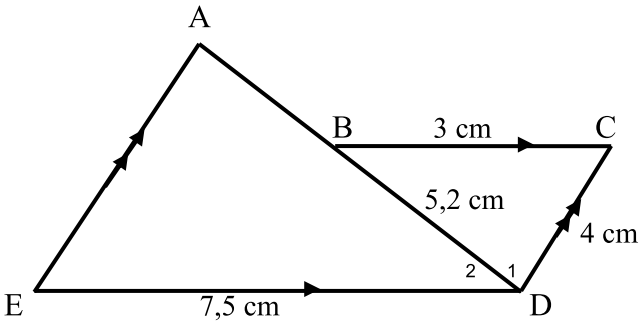
(4)

6.2 AB = BE and BF = FD. Prove that DC = BE.



(4)

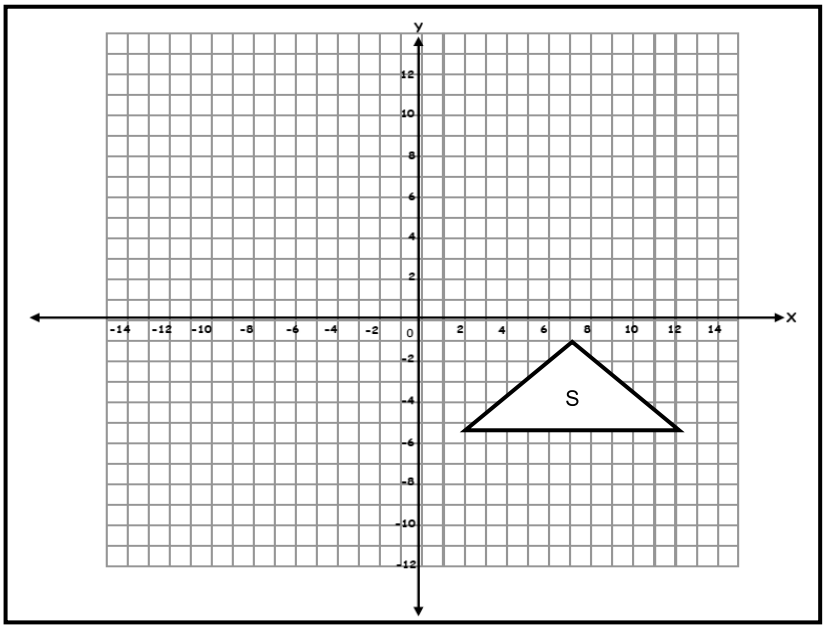
6.3 Study the diagram below and answer the questions that follow.



6.3.1 Prove that ΔAED /// ΔDCB. (6)

6.3.2 Hence, find the length of AD. (4)

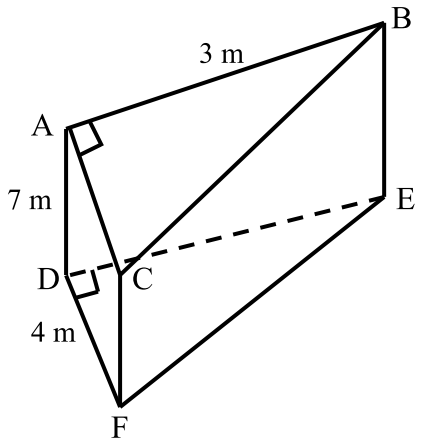
6.4 Draw the image of Δ S after a rotation of 90^0 anticlockwise about the origin O (0 ; 0).
Use ANSWER SHEET B to answer this question.



(3)
[21]

QUESTION 7

7.1 Study the prism below and answer the questions that follow.

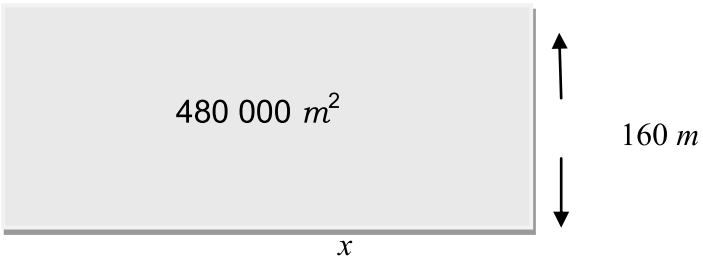


7.1.1 Find the length of BC. (4)

7.1.2 Draw the net of the prism in your answer book. (1)

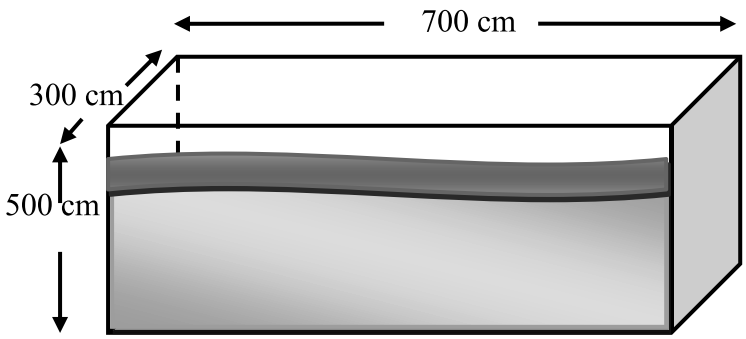
7.1.3 Calculate the surface area of the prism. (3)

7.2 A field, 480 000 m^2 is 160 m wide. What length of fencing is needed to fence it?



(4)

7.3 A rectangular fish tank with an open top is shown below.



7.3.1 Calculate the volume of the tank. (2)

7.3.2 How many litres of water do we need to fill the tank? (2)

[16]

QUESTION 8

8.1 A set of data below are marks obtained by Grade 9 learners in one of their Mathematics tests. The test was out of 50 marks.

4 , 12 , 16 , 8 , 16 , 24 , 32 , 12 , 24 , 36 , 48 , 16 , 32 , 48

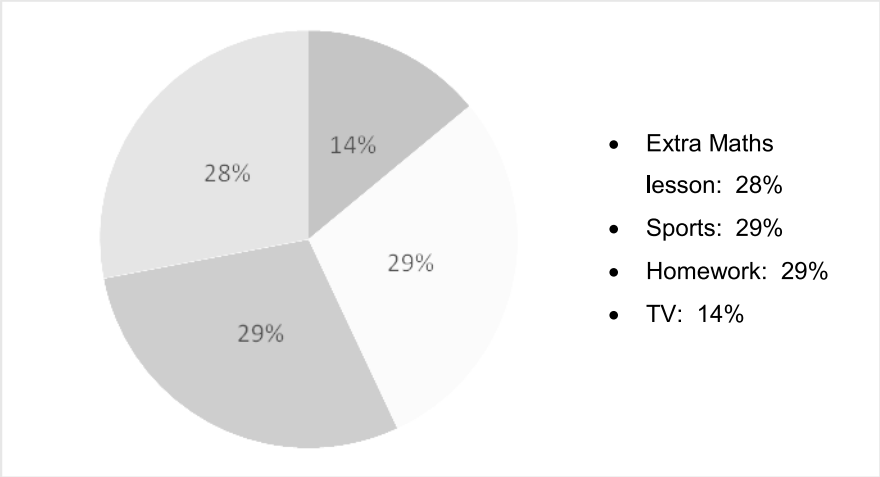
8.1.1 Calculate the mean and median of the data. (3)

8.1.2 What is the mode? (1)

8.1.3 Calculate the range. (1)

8.2 The chart below represents Sipho's daily activities after school from Monday to Friday of each week. He has seven hours daily to run all these activities.

Sipho's after school activity schedule



8.2.1 On which activity does he spend the most of his time? How many hours does he spend on this activity? (2)

8.2.2 On which activity does he spend the least time? How many hours does he spend on this activity? (2)

8.3 Two red, one white and three blue marbles are put into a bag. If you put your hand once into the bag without looking and pull out one marble, what is the probability of:

8.3.1 Pulling out a blue marble? (2)

8.3.2 Not pulling out a white marble? (1)

[12]

TOTAL: 120

END

FORMULA SHEET

Simple Interest:	Compound Interest:
$I = \frac{Prn}{100}$ $A = P(1 + in)$ $A = P(1 + \frac{rn}{100})$	$A = P(1 + i)^n$ $A = P(1 + \frac{r}{100})^n$

	Perimeter	**Area**
Square	$4(l)$	l^2
Rectangle	$2(l + b)$	$l \times b$
Circle	$2\pi r$	πr^2
Triangle	$(s1 + s2 + s3)$	$\frac{1}{2} b \times\perp h$
Parallelogram	$2(b + l)$	$b \times\perp h$
Trapezium	Sum of the 4 sides	$\frac{1}{2}(a + b) \times\perp h$ a and b = parallel lines
Rhombus	$4l$	$b \times\perp h$
Kite	$2(a + b)$ a and b = length of equal sides	$\frac{1}{2} \times d_1 d_2$ d_1 and d_2 = diagonals

ANSWER SHEET A

Name: _____ Grade: 9 _____

SECTION A

Marks: ___
10

Circle the letter of the correct answer. **Submit this with your answer book.**

Question	Answer			
1.1	A	B	C	D
1.2	A	B	C	D
1.3	A	B	C	D
1.4	A	B	C	D
1.5	A	B	C	D
1.6	A	B	C	D
1.7	A	B	C	D
1.8	A	B	C	D
1.9	A	B	C	D
1.10	A	B	C	D

ANSWER SHEET B

NAME: _____ GRADE: 9 ____

QUESTION 6.4