



**basic education**

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Department:  
Basic Education  
REPUBLIC OF SOUTH AFRICA

**ANNUAL NATIONAL ASSESSMENT**

**GRADE 9**

**MATHEMATICS**

**EXEMPLAR TEST 2012**

**Instructions to learners:**

1. Question **1** consists of 10 multiple choice questions. Learners must circle the letter of the correct answer (see example below).
2. Learners must provide answers to questions **2** to **9** in the spaces provided.
3. Approved scientific calculators (non-programmable and non-graphical) may be used.
4. The test duration is  $2\frac{1}{2}$  hours.

**Example**

**Circle the letter of the correct answer.**

Which of the numbers below is a mixed number?

0 ; 0,2 ;  $\frac{1}{8}$  ;  $2\frac{1}{4}$

- A. 0
- B.  $2\frac{1}{4}$
- C. 0,2
- D.  $\frac{1}{8}$

You have done it correctly if you have circled **B** as above.

**The test starts on the next page.**

## QUESTION 1

1. Answer the following questions.

1.1 Which of the following numbers is irrational?

A  $0,\dot{8}$

B  $0,5$

C  $-\sqrt{3}$

D  $\sqrt{2\frac{1}{4}}$  (1)

1.2 Which of the following numbers lie between 0,07 and 0,08 on a number line?

A  $0,00075$

B  $0,0075$

C  $0,075$

D  $0,75$  (1)

1.3  $\frac{2^{x-1} \cdot 4^{x+1}}{8^{x-1}} =$

A  $3$

B  $x + 1$

C  $0,25$

D  $16$  (1)

1.4  $\sqrt{16x^{16}} =$

A  $4x^8$

B  $4x^4$

C  $8x^8$

D  $8x^4$

(1)

1.5  $-(-3)^3 =$

A  $-9$

B  $27$

C  $-27$

D  $-6$

(1)

1.6  $\left(\frac{x}{3} - 3y\right)\left(\frac{x}{3} + 3y\right) =$

A  $\frac{x^2}{9} + 3xy - 9y^2$

B  $\frac{x^2}{9} + xy - 9y^2$

C  $\frac{x^2}{9} + 9y^2$

D  $\frac{x^2}{9} - 9y^2$

(1)

1.7 Factorise  $2p^2 + 2$ .

A  $2(p + 1)^2$

B  $2(p^2 + 1)$

C  $2(p + 1)(p - 1)$

D  $2p(p + 1)$

(1)

1.8 A painter is paid by the hour. If he is paid R360 for 12 hours work, how much will he be paid for 9 hours work?

A R120

B R180

C R270

D R480

(1)

1.9 Which number is missing in the sequence  $1; \frac{1}{2}; \frac{1}{4}; \dots; \frac{1}{16}$ ?

A  $\frac{1}{8}$

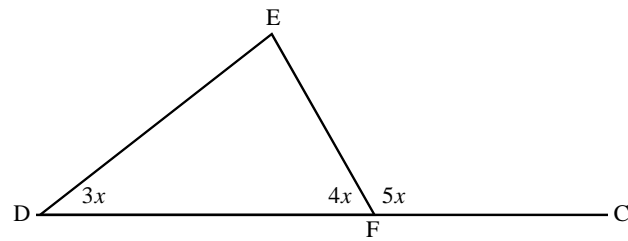
B  $\frac{1}{10}$

C  $\frac{1}{12}$

D  $\frac{1}{14}$

(1)

1.10 In  $\triangle EDF$ ,  $DF$  is produced to  $C$ . The size of  $\hat{E}$  is



- A  $40^\circ$
- B  $60^\circ$
- C  $140^\circ$
- D  $20^\circ$

(1)

**[10]**

**QUESTION 2**

2. Answer the following questions.

2.1 Write 0,00000356 *kl* in scientific notation.

\_\_\_\_\_ (2)

2.2 Calculate the value of  $2x^3 - 3x^2 + 9x + 2$  if  $x = -2$ .

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (4)

2.3 Multiply  $5a^2b^2 + 2ab - 3$  by  $4ab$

\_\_\_\_\_ (3)

2.4 Simplify:

2.4.1  $(a^2 b^3)^2 \cdot ab^2$

\_\_\_\_\_  
\_\_\_\_\_ (2)

2.4.2  $\frac{x-y}{y+x} \times \frac{(x+y)^2}{x-y}$

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(2)

2.4.3  $\frac{3a^{-2}b \times 24b^{-1}a^{-1}}{9a^{-4}b^{-3}}$

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(3)

2.4.4  $\frac{x-2}{2x} - \frac{x-3}{3x}$

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(5)



2.4.5  $\frac{4x^2}{2a^2} \div \frac{4x}{2a^2}$

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(2)

2.4.6  $\frac{x^2-1}{3x+3}$

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(2)

2.5 Factorise fully:

2.5.1  $3a^3 - 9a^2 - 6a$

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(2)

2.5.2  $4(a + b) - x^2(a + b)$

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(4)

2.6 Solve for  $x$ :

2.6.1  $8x + 3 = 3x - 22$

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(2)

2.6.2  $x - \frac{x-1}{2} = 3$

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(3)

2.6.3  $3^{x+1} = 81$

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(3)

**[40]**

### QUESTION 3

3. Answer the following questions.

3.1 Write the ratio  $1\frac{2}{3} : 2\frac{2}{3}$  in the simplest form.

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(2)

3.2 6 boys each contribute R155,50 towards the purchase of a tent. Calculate how much each would contribute if there were 10 boys in the group.

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(3)

3.3 How long will it take for an investment of R3000 at 8% per annum simple interest to earn R960 interest?

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(3)

3.4 Calculate what R10000 will amount to if it is invested at 10 % per annum compound interest for 3 years.

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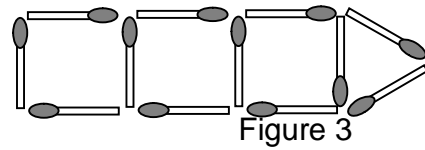
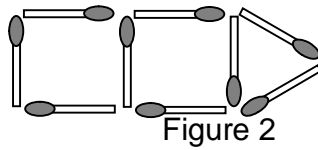
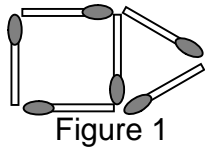
(3)

**[11]**

**QUESTION 4**

4. Answer the following questions.

Matchsticks are arranged as shown in the following figures.



4.1 Determine the number of matchsticks in the next figure if the pattern is continued.

\_\_\_\_\_ (2)

4.2 Write down the general term of the given sequence of the matchsticks in the form.

$T_n =$  \_\_\_\_\_ . (2)

4.3 Determine the number of matchsticks in the 20<sup>th</sup> figure.

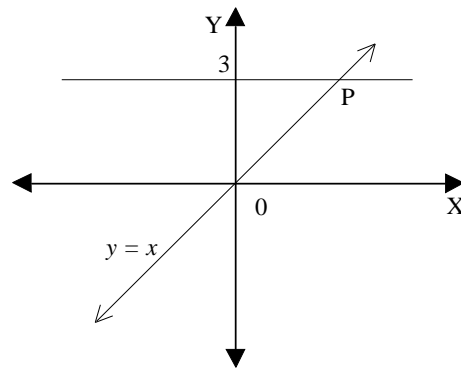
\_\_\_\_\_ (2)

**[6]**

### QUESTION 5

5. Answer the following questions.

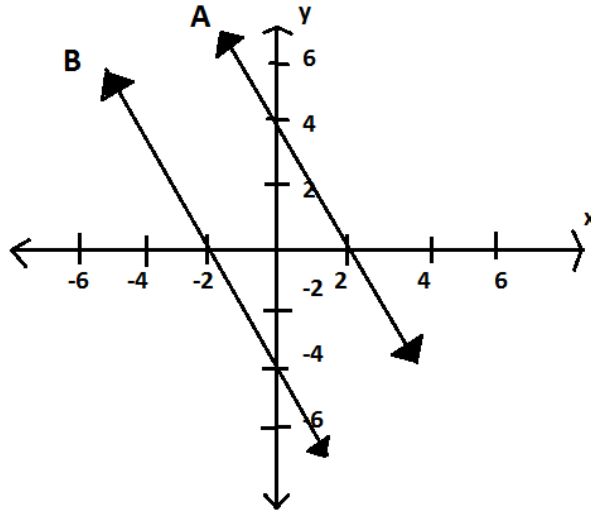
5.1 Determine the co-ordinates of P in the graph below.



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(1)

5.2 Write down the defining equation of each of the following straight line graphs.



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(4)

5.3 What can you deduce about lines AD and BC?

Give a reason for your answer.

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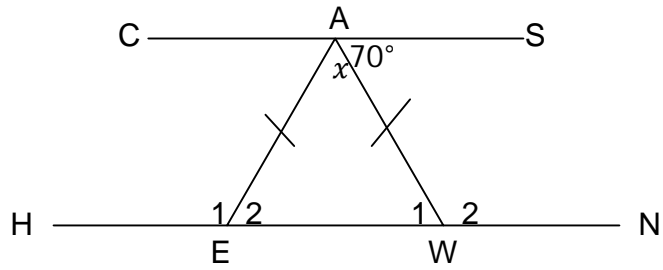
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(2)

[ 7 ]

**QUESTION 6**

6. Answer the following questions.



6.1 In the above figure,  $CS \parallel HN$ ,  $\angle EAW = 70^\circ$ ,  $AE = AW$  and  $\angle CAE = x$ . Determine the value of  $x$ .

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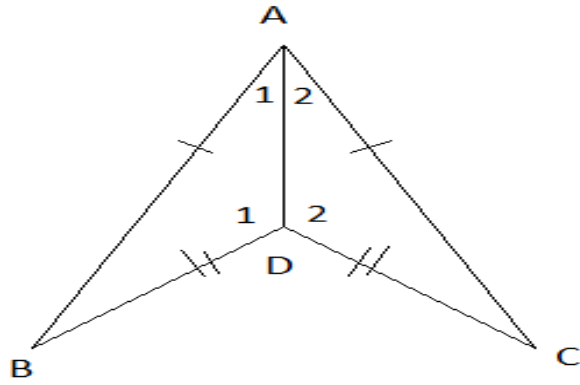
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(3)





6.2 In the above figure,  $AB = AC$  and  $BD = CD$ .

6.2.1 Prove that  $\triangle ABD \cong \triangle ADC$

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(4)

6.2.2 Prove that DA bisects  $\hat{BAC}$ .

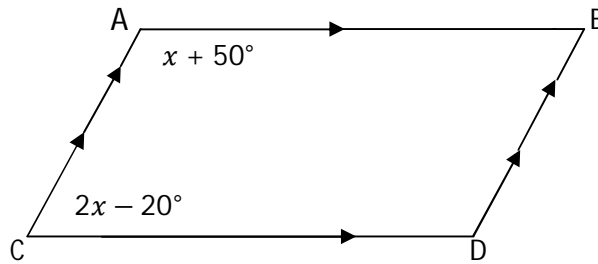
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(2)

6.3 ABCD is a parallelogram .Calculate the size of  $\hat{B}$ .



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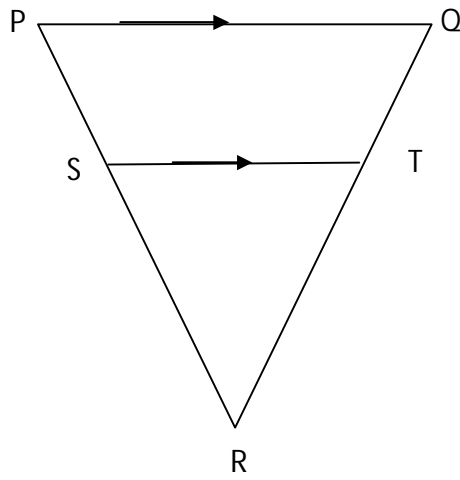
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(4)

6.4 In  $\Delta PQR$ ,  $PQ \parallel ST$ ,  $PR = 10 \text{ cm}$ ,  $ST = 3 \text{ cm}$  and  $SR = 6 \text{ cm}$



6.4.1 Show that  $\Delta PQR \parallel \Delta STR$

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(4)

6.4.2 Calculate length of PQ.

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(3)

[21]

### QUESTION 7

7. Answer the following questions.

7.1 A ladder is standing against the wall. If the ladder reaches a height of  $12m$  up the wall and has its foot  $5m$  away from it, calculate the length of the ladder.

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(3)

7.2 What is the height, correct to the nearest  $cm$ , of a 5 litre cylindrical oil container with a radius of  $20cm$ ? ( $1\text{ litre} \approx 1000\text{ cm}^3$ )

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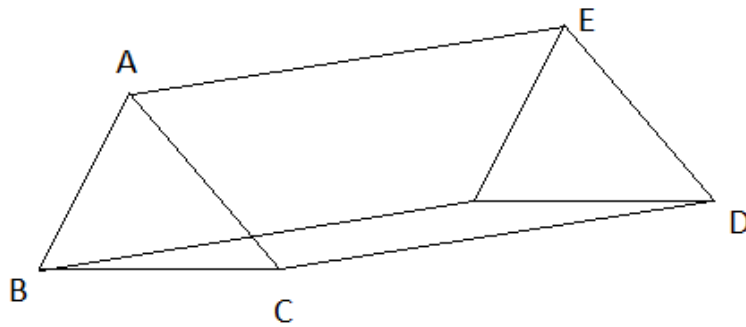


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(3)



7.3 In the above triangular prism ,  $AB = 3\text{ cm}$ ,  $AC = 4\text{ cm}$ ,  $BC = 5\text{ cm}$  and  $CD = 12\text{ cm}$ .

7.3.1 Show that  $\triangle ABC$  is a right- angled triangle .

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(4)

7.3.2 Hence, calculate the surface area of the prism.

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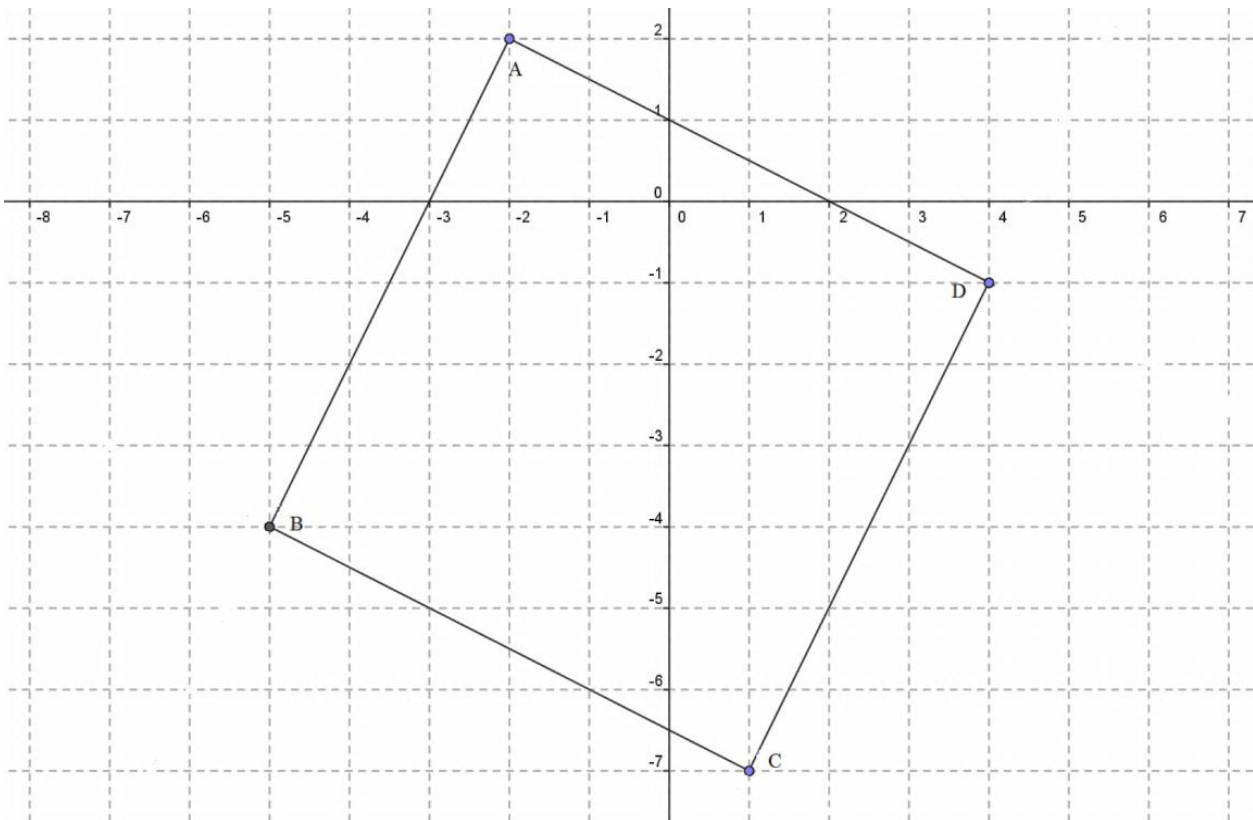
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(4)

[14]

### QUESTION 8

8. Answer the following questions.



8.1.1 Use the sketch given above and write down the co-ordinates of A, B, C and D.

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(4)

8.1.2 If the figure is shifted 2 units vertically down and 2 units horizontally to the right, write down the co-ordinates of A', B', C', and D'.

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(4)

8.1.3 Write down the co-ordinates of C'' , the image of C , if the figure is reflected in the X-axis

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(2)

8.1.4 Write down the co-ordinates of B'' , the image of B , if the figure is reflected in the Y-axis.

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(2)

**[12]**

### QUESTION 9

9. Answer the following questions.

9.1 The data set contains the heights of a class of grade 9 learners.

140	149	152	159	153	143	161	152	145	162
153	158	154	160	164	165	165	155	167	153
148	166	144	160	150	155	141	162	161	151
159	163	170	153	172	158	174	166	164	163

9.1.1 Complete the table.

Class-interval	Tally marks	Frequency
140---144		
145---149		
150---154		
155---159		
160---164		
165---169		
170---174		

(14)

9.2 Determine:

9.2.1 the range of the heights.

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(2)



9.2.2 the modal class-interval.

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(2)

9.2.3 in which class-interval the median lies.

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(2)

**[20]**

**TOTAL: 140**