



basic education

Department:  
Basic Education  
REPUBLIC OF SOUTH AFRICA

## ANNUAL NATIONAL ASSESSMENTS 2010

## GRADE 9 MATHEMATICS - ENGLISH

## FORM A

SURNAME

GENDER (TICK ☒)

BOY

GIRL

NAME(S)

PROVINCE

DATE OF BIRTH

SCHOOL NAME

EMIS NO.

DISTRICT / REGION

## 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 8 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 number comes next in the pattern?

2 ; 4 ; 6 ; 8 ; \_\_\_\_\_

a. 9

☒ b. 10

c. 12

d. 20

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

The test begins on the next page.

### QUESTION 1

1.1 If  $(x - 1)(x + 2) = 0$  then  $x =$

- A.  $-1$  or  $2$
- B.  $1$  or  $-2$
- C.  $1$
- D.  $-2$

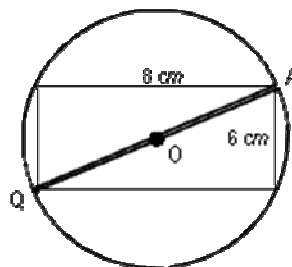
1.2 
$$\frac{(x^2)^3(x^3)^2}{(x^3)^3} =$$

- A.  $x$
- B.  $x^3$
- C.  $x^6$
- D.  $x^4$

1.3 In the figure below, the rectangle within the circle, with centre O, is 8 centimetres long and 6 centimetres wide.

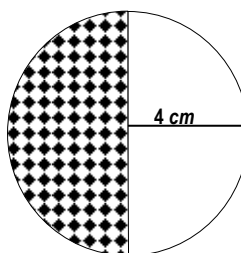
What is the length of the diameter QA in *cm*?

- A.  $10$
- B.  $5$
- C.  $14$
- D.  $8$



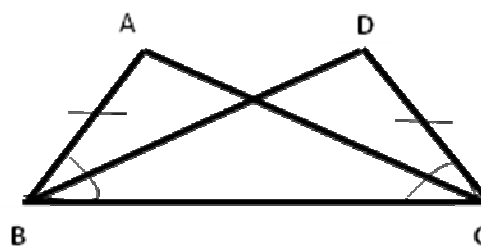
1.4 In the sketch the circle has a radius of 4 cm. What is the area in  $\text{cm}^2$  of the shaded part of this circle?

- A.  $16\pi$
- B.  $8\pi$
- C.  $\frac{4}{3}\pi$
- D.  $\frac{8}{3}\pi$



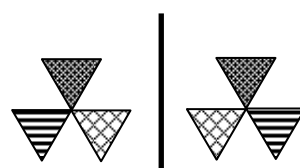
1.5 Why is  $\triangle ABC \cong \triangle DCB$ ?

- A. S S S
- B.  $90^\circ$  H S
- C. S < S
- D. < < S



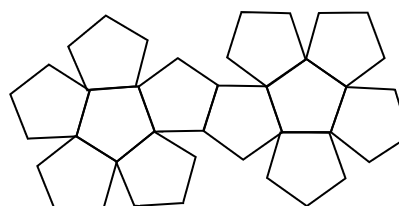
1.6 The geometric shape on the left side of the solid line can be made to fit onto the geometric shape on the right side of the solid line by:

- A. translation
- B. enlargement
- C. rotation
- D. reflection

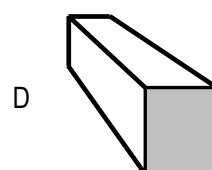
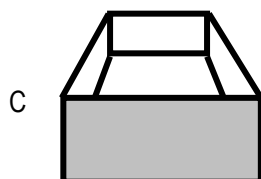
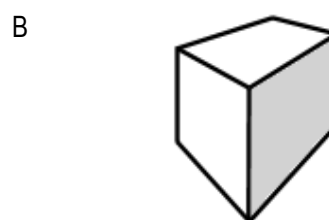
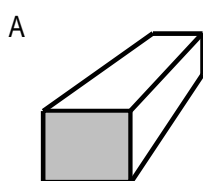


1.7 A net of a polyhedron is given below. This is a net of a/an:

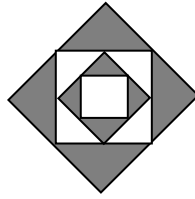
- A. tetrahedron
- B. octahedron
- C. dodecahedron
- D. icosahedron



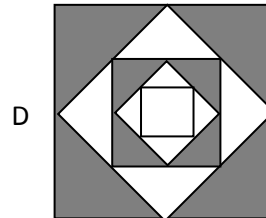
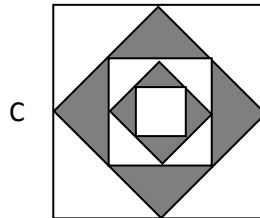
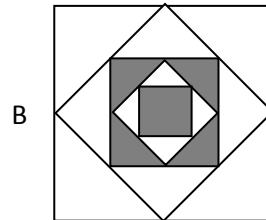
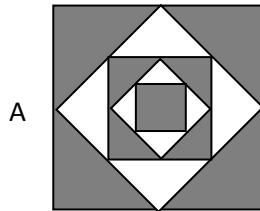
1.8 Which of the drawings below represents a perspective view of a rectangular box with one face viewed straight on?



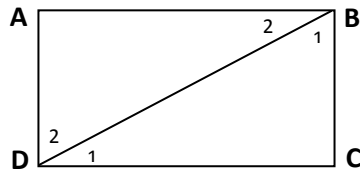
1.9 Study this growing pattern.



If you grow this pattern further the next diagram will be:



1.10 Which angle in rectangle ABCD is the angle of depression of D from B?



- A.  $\hat{B}_1$
- B.  $\hat{B}_2$
- C.  $\hat{D}_1$
- D.  $\hat{D}_2$

[10]

## QUESTION 2

2.1 Simplify:

2.1.1  $(2x^2 + 3x - 4) - (x^2 - 2x - 6)$

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(3)

2.1.2 
$$\frac{-4m^3n \times 10mn^2}{5m^4n^3}$$

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(3)

2.1.3 
$$\frac{1,6 \times 10^{-3} + 4,0 \times 10^{-4}}{4,0 \times 10^{-3} - 0,2 \times 10^{-2}}$$

(Do **NOT** Use a calculator)

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(4)

2.2 Multiply and simplify:

2.2.1  $\frac{2}{3}(12a^2 - 3a - 6)$

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(3)

2.2.2  $(a - 4b)(a - 2b)$

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(3)

2.3 Factorise fully:

2.3.1  $6k + 12k^2 - 3k^3$

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(2)

2.3.2  $16y^2 - 49$

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(2)

2.3.3  $3x^2 - 12$

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(3)

2.4 Use prime factors to determine the value of  $\sqrt{784}$

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(4)

2.5 Solve for  $x$ :

2.5.1  $2x - 3 = 17 + x$

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(2)

2.5.2  $\frac{3x + 4}{2} = 2$

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(3)

2.5.3  $\frac{2(x+5)}{3} = 1 - \frac{3(x-5)}{4}$

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(5)

**[37]**

### QUESTION 3

- 3.1 Show by calculation which is the better investment?  
R8 000 invested at 3,5% compound interest per annum for 3 years **or**  
R8 000 invested at 7,5% simple interest per annum for 3 years.

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(5)

- 3.2 Mark travels between two towns A and B at an average speed of 70 kilometres per hour for  $4\frac{1}{2}$  hours. On his return from town B to A, he travelled at an average speed of 90 kilometres per hour. How long did he take on his return trip?

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(4)

[9]

#### QUESTION 4

4.1 Write down the next two terms in the given sequence:

-1; 1; 3; .... ; ....

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(2)

4.2 Describe the pattern in **QUESTION 4.1** in your own words.

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(1)

4.3 Write down the general term of the given sequence in the form

$T_n =$  \_\_\_\_\_.

(2)

4.4 Which term in the sequence is equal to 37?

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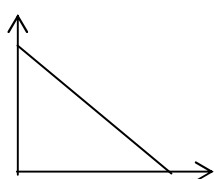
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(2)

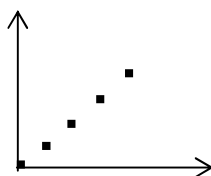
[7]

#### QUESTION 5

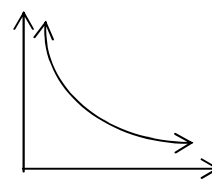
5.1 Use the graphs below to answer the questions that follow.



**a**



**b**



**c**

Which of the above graphs represents:

5.1.1 A discrete, increasing, linear function? \_\_\_\_\_ (1)

5.1.2 A continuous, decreasing, linear function? \_\_\_\_\_ (1)

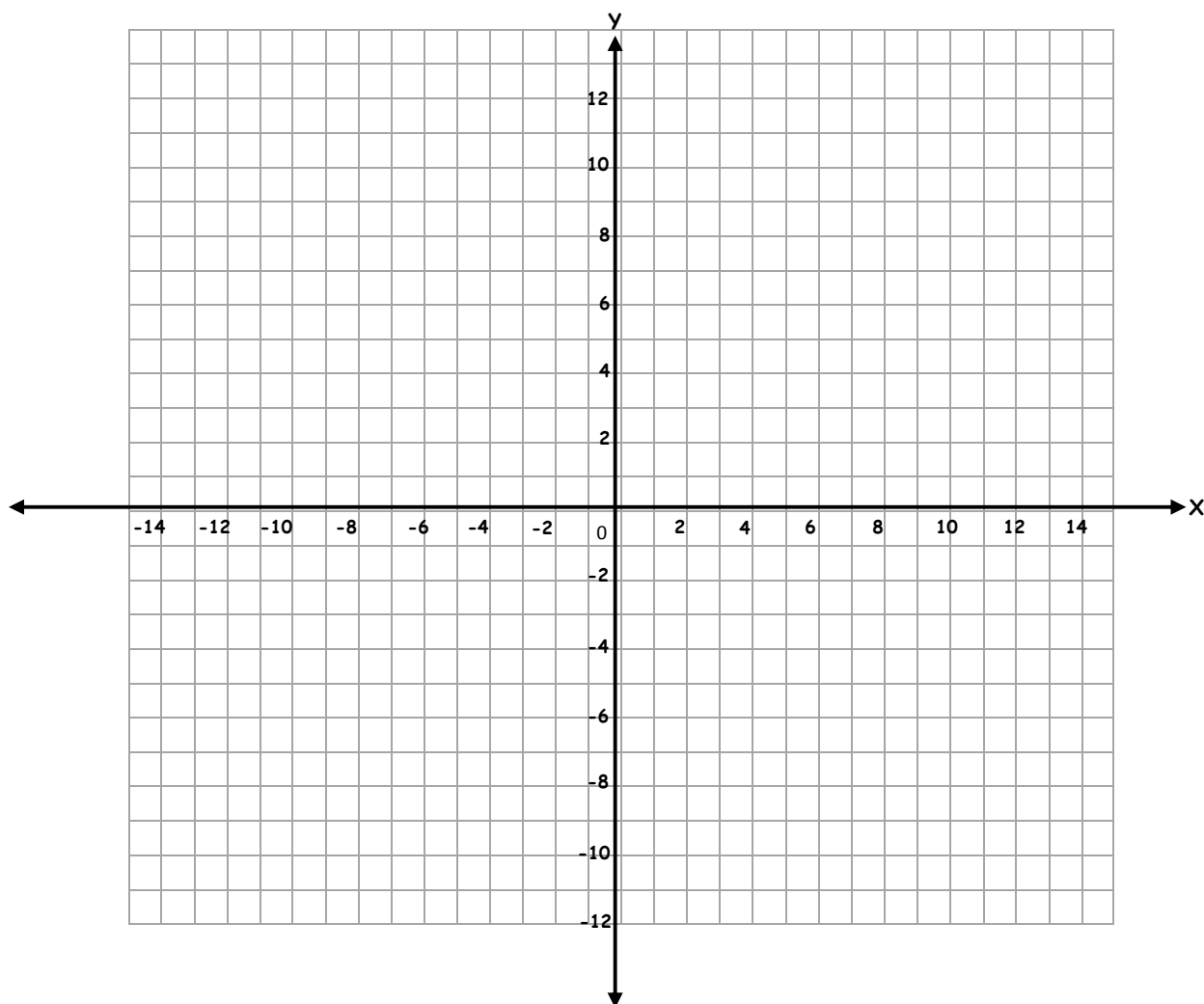
5.1.3 An indirect proportion? \_\_\_\_\_ (1)

5.2 Use the grid below. On the same system of axes draw and label the graphs defined by:

(7)

$$y = x + 4, \quad \text{if } x \in \{-1, 0, 1, 2\} \quad \text{and}$$

$$y = -2x + 4, \quad \text{if } x \in \mathbb{R}$$



[10]

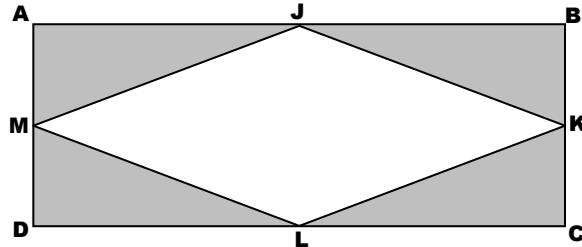
## QUESTION 6

In QUESTION 6 give reasons for each of your statements.

6.1 In rectangle ABCD:

Points J, K, L and M are the mid-points of sides AB, BC, CD and DA respectively;

$AB = 24$  cm and  $AD = 10$  cm



6.1.1 What kind of quadrilateral is JKLM?

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(1)

6.1.2 Calculate the length of line-segment KL.

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(5)

6.1.3 Calculate the perimeter of quadrilateral JKLM.

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(1)

6.1.4 Prove that  $\triangle JBK \equiv \triangle LDM$

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(7)

6.1.5 Determine the value of  $t$  if the area of JKLM =  $t \times$  (the area of ABCD).

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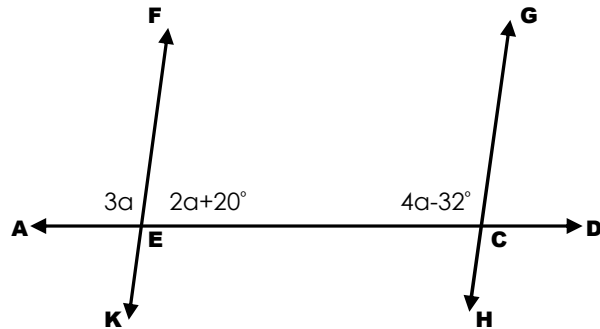
(5)

- 6.2 In the diagram below, line FK intersects line AD at point E and Line GH intersects line AD at point C.

$$\hat{F}EA = 3\alpha$$

$$\hat{F}EC = 2\alpha + 20^\circ$$

$$\hat{G}CE = 4\alpha - 32^\circ$$



- 6.2.1 Calculate the value of  $\alpha$ .

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(4)

- 6.2.2 Calculate the sizes of  $\hat{F}EA$  and  $\hat{H}CD$ .

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(5)

- 6.2.3 What can you deduce about line FK and line GH? Give **one** reason for your deduction.

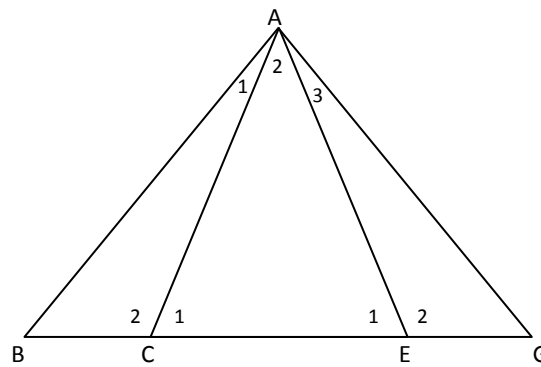
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(2)

6.3 In the figure below  $AC = AE$  and  $AB = AG$



6.3.1 Show that  $\hat{C}_2 = \hat{E}_2$

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(4)

6.3.2 Show with reasons that  $\triangle ABC$  and  $\triangle AGE$  are similar.

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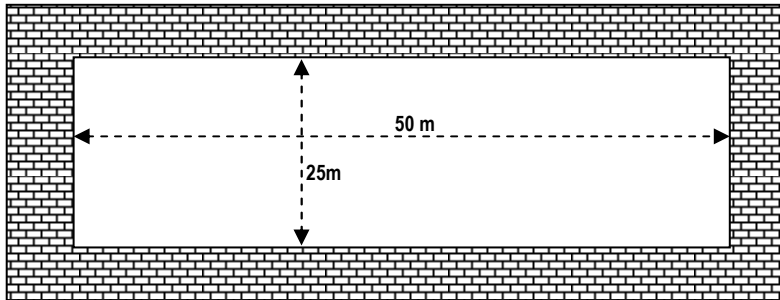
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(5)

- 6.4 The dimensions of the Olympic swimming pool are shown in the following diagram. The pool has a uniform depth.



- 6.4.1 The total capacity of the Olympic pool is 2 500 000 litres. What is the volume of the pool in cubic metres?

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(2)

- 6.4.2 Calculate the depth of the Olympic pool. Write the answer in metres.

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(4)

- 6.4.3 In 1996, Penny Heyns of South Africa broke the world record by completing the 100 metre breaststroke in 1 minute and 7,02 seconds. Calculate her average swimming speed in metres per second. **(Round off your answer to two decimal places).**

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(4)

- 6.4.4 The space around the pool is paved. The uniform width of the paving is 2,5 metres. Calculate the area of the paving in square metres.

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(4)

[53]

### QUESTION 7

- 7.1 Lucy has **two** R50 notes, **one** R20 note, and **three** R10 notes in her pocket.

- 7.1.1 She randomly takes out one of the notes from her pocket to buy sweets. What is the probability of her taking out a R50 note?

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(1)

- 7.1.2 She takes out a note, and then takes out another note. Draw a tree diagram to illustrate the sequence of events.

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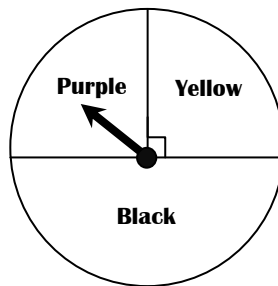
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(3)

7.2 The spinner below is spun twice in succession.



7.2.1 What is the probability that the arrow will point to yellow after the first spin and to black after the second spin?

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(2)

7.2.2 Suppose the spinner was spun 50 times and the frequencies of the outcomes are as follows:

| Purple | Yellow | Black |
|--------|--------|-------|
| 15     | 10     | 25    |

Calculate the relative frequency of purple as an outcome?

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(2)

[8]

### QUESTION 8

8. The following scores are arranged in an ascending order, where y and z are variables.

**1; 3; 5; 5; y; 6; 6; z**

- 8.1 If the median of the scores is  $5\frac{1}{2}$  calculate the value of y.

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(2)

- 8.2 If the mean of the scores is 5 calculate the value of z.

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(3)

- 8.3 What is the mode of the scores?

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(1)

**[6]**

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**Total [140]**