



# basic education

Department:  
Basic Education  
REPUBLIC OF SOUTH AFRICA

MARKS

## ANNUAL NATIONAL ASSESSMENT 2012 GRADE 9 MATHEMATICS TEST

MARKS: 140

TIME: 2½ hours

PROVINCE \_\_\_\_\_

REGION \_\_\_\_\_

DISTRICT \_\_\_\_\_

SCHOOL NAME \_\_\_\_\_

NATIONAL EMIS NUMBER (9 digits)

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CLASS (e.g. 9A) \_\_\_\_\_

SURNAME \_\_\_\_\_

NAME \_\_\_\_\_

GENDER (✓)

BOY

GIRL

DATE OF BIRTH

C	C	Y	Y	M	M	D	D
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\* 9 M A T H \*

This test consists of 23 pages, excluding the cover page.

### Instructions to learners.

1. Read all the instructions carefully.
2. Question 1 consists of 10 multiple-choice questions. You must circle the letter of the correct answer.
3. Answer questions 2 to 9 in the spaces or boxes provided.
4. All working must be shown.
5. The test duration is  $2\frac{1}{2}$  hours.
6. The teacher will lead you through the practice exercise before you start the test.
7. Approved scientific calculators (non-programmable and non-graphical) may be used.

### Practice exercise

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 circled B.

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

## QUESTION 1

1.1 The next number in the sequence 1; 9; 25; ... is

- A 33
- B 36
- C 49
- D 50

1.2 Which of the following numbers is a rational number?

- A  $\sqrt{3}$
- B  $\sqrt{16}$
- C  $\sqrt{-9}$
- D  $\sqrt{13}$

1.3 The two missing numbers in the sequence below

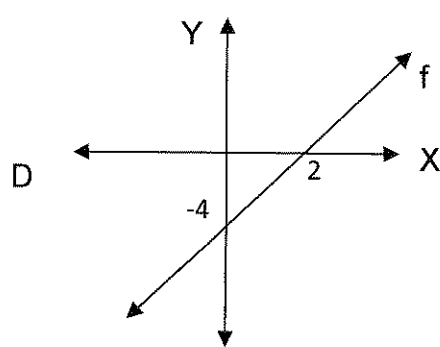
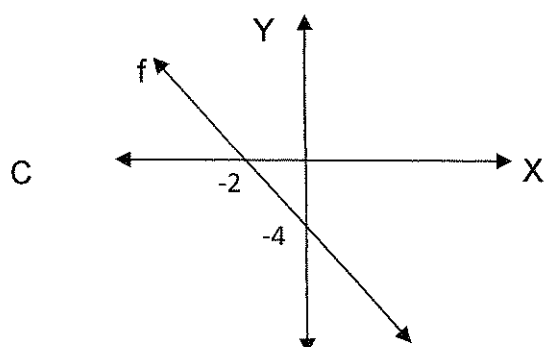
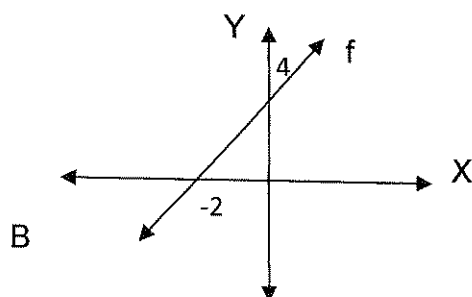
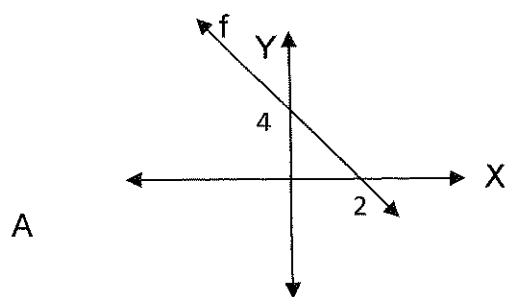
18; 36; \_\_\_; 72; \_\_\_; 108

- A 38 and 74
- B 42 and 78
- C 54 and 90
- D 45 and 81

1.4  $5^0 \times 3^{-2} =$

- A -6
- B 45
- C  $\frac{1}{9}$
- D 9

1.5 The graph of the straight line defined by  $f(x) = 2x + 4$  is



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

- A  $-1$  or  $0$
- B  $1$  or  $-2$
- C  $1$
- D  $-2$

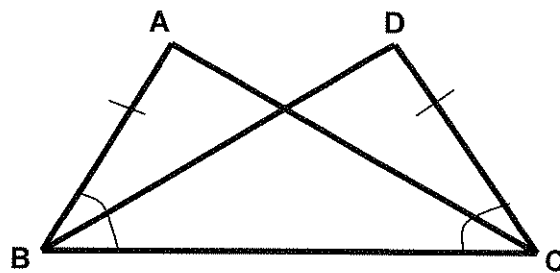
1.7 The volume of a cube with side length of  $7\text{ cm}$  is

- A  $49\text{ cm}^3$
- B  $28\text{ cm}^3$
- C  $343\text{ cm}^3$
- D  $14\text{ cm}^3$

1.8 The 3-D figure which has 5 faces, 5 vertices and 8 edges is a

- A cylinder
- B triangular prism
- C square-based pyramid
- D triangular-based pyramid

1.9 Why is  $\triangle ABC \equiv \triangle DCB$  ?



- A s, s, s
- B  $90^\circ$ , hyp, s
- C s,  $<$ , s
- D  $<$ ,  $<$ , s

1.10 The probability of picking an odd number from numbers 1 to 13 is

- A  $\frac{6}{13}$
- B  $\frac{7}{13}$
- C  $\frac{1}{13}$
- D  $\frac{1}{2}$

[10]

## QUESTION 2

2.1 Write 0,00000356 kℓ in scientific notation.

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(1)

2.2 Simplify.

2.2.1  $(3x)^3 + 2x^3$

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(2)

2.2.2  $\frac{a^2b^2}{ac^2} \times \frac{4a^2bc}{20b^3}$

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(2)

2.3 Multiply and simplify if necessary.

2.3.1  $4ab(5a^2b^2 + 2ab - 3)$

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(3)

2.3.2  $(2x - 1)^2 - (x + 1)(x - 1)$

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(3)

2.4 Factorise fully.

2.4.1  $8p^3 + 4p^2$

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(2)

2.4.2  $9p^2 - 36q^2$

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(2)

2.4.3  $tx - ty - 2x + 2y$

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(4)

2.5 Solve for  $x$ .

2.5.1  $3(x + 6) = 12$

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(2)

$$2.5.2 \quad x^2 - 2x = 0$$

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(3)

$$2.5.3 \quad \frac{x+1}{3} - \frac{x-1}{6} = 1$$

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(3)

$$2.5.4 \quad 2^{x+1} = 32$$

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(3)  
[30]

### QUESTION 3

- 3.1 There are 240 children at a party. The ratio of the number of boys to the number of girls at the party is 3 : 1.  
How many boys are there at the party?

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(2)

- 3.2 Petrus takes a bus to school. The bus travels at an average speed of  $40 \text{ km/h}$ . The school is  $9 \text{ km}$  from his house.  
How many minutes does he take to get to school?

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(3)

- 3.3 Bongiwe invests R12 000 in a savings account at 6,5% per annum compound interest.  
Calculate how much there will be in the savings account after 5 years.

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(3)

- 3.4 Philani bought a scooter for R15 000. He paid 15% of the amount in cash and signed a hire-purchase agreement to pay the balance in 24 equal monthly instalments. The interest rate is 10% per annum.

3.4.1 How much did he pay in cash?

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(1)

3.4.2 Calculate the total amount that he must still pay.

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(4)

3.4.3 Calculate the monthly instalment.

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(2)  
[15]

#### QUESTION 4

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

3; 8; 13; \_\_\_\_\_; \_\_\_\_\_; (2)

4.2 Describe the pattern in question 4.1 in your own words.

\_\_\_\_\_  
\_\_\_\_\_ (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 38?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (3)  
**[8]**

## QUESTION 5

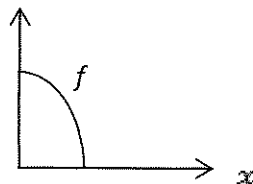
5.1 Underline the word, the number or the equation between brackets so that each of the following statements is correct.

5.1.1 The lines  $x = 4$  and  $x = -4$  lines are (parallel/perpendicular) to one another. (1)

5.1.2 The equation of the horizontal line through the point  $P(3; -2)$  is ( $x = 3$  /  $y = -2$ ). (1)

5.1.3 The gradient of the line defined by  $y - 4x + 5 = 0$  is equal to ( $-4$  /  $4$ ). (1)

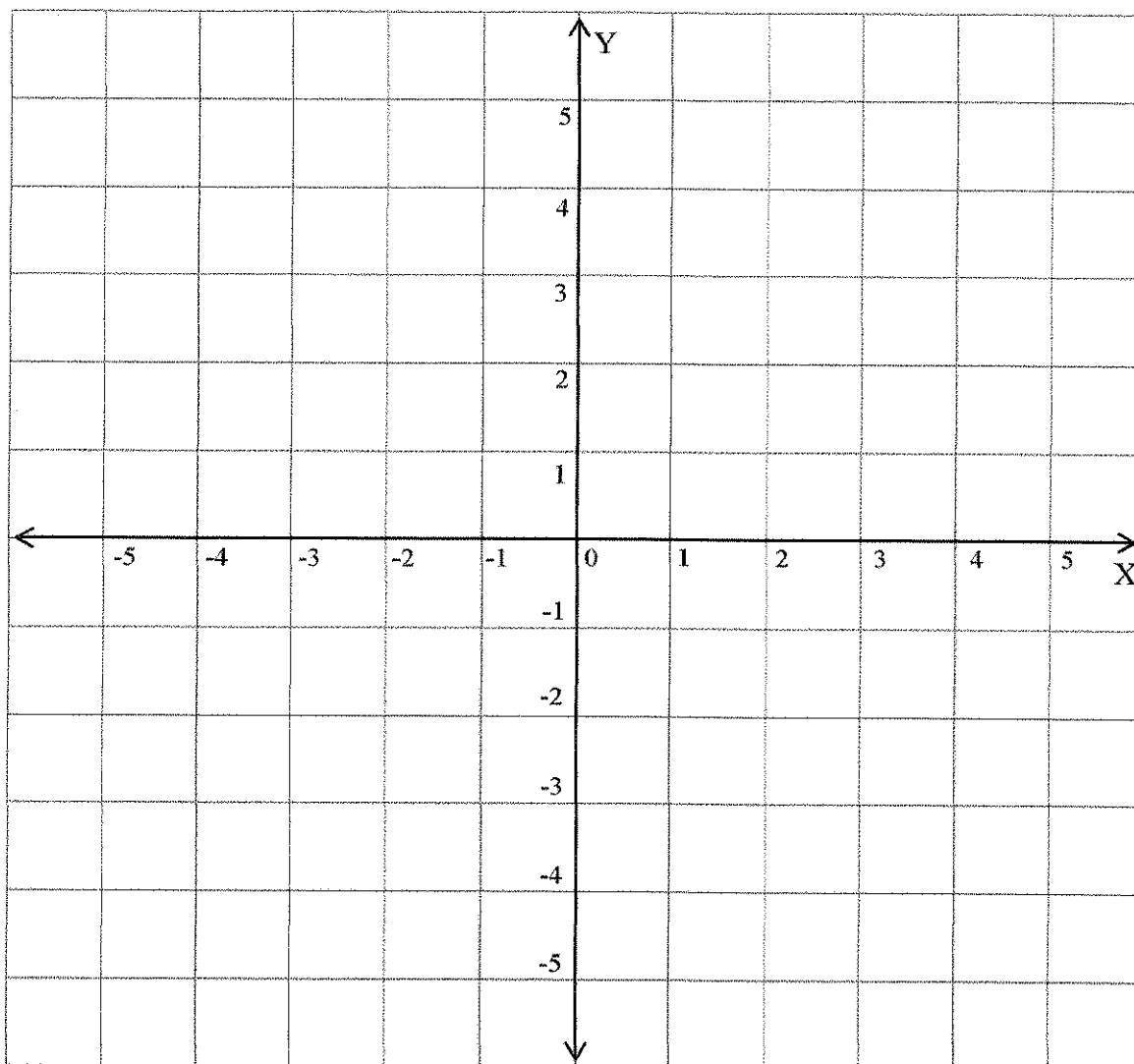
5.1.4 This graph of  $f$  below represents a (linear/non-linear) function.



(1)

## 5.2

5.2.1 On the same set of axes, draw and label the graphs defined by  $y = -2x + 1$  and  $y = x - 2$ . Use the given grid and clearly indicate the points where the lines cut the axes.



(8)

5.2.2 The lines intersect at T. Show by calculation that the co-ordinates of T are  $x = 1$  and  $y = -1$  or  $(1; -1)$ .

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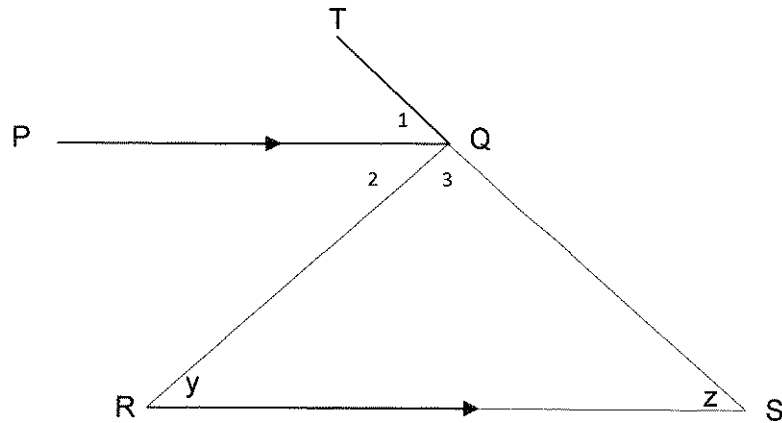
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(2)  
[14]

## QUESTION 6

Give reasons for each of your statements in question 6.1 and 6.2.

- 6.1 In the figure  $PQ \parallel RS$ ,  $\hat{Q}_1$ ,  $\hat{Q}_2$  and  $\hat{Q}_3$  are equal to  $2x$ ,  $3x$  and  $4x$  respectively.  $\hat{R} = y$  and  $\hat{S} = z$ .



- 6.1.1 Calculate the value of  $x$ .

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(3)

6.1.2 Calculate the value of  $y$ .

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(3)

6.1.3 Calculate the value of  $z$ .

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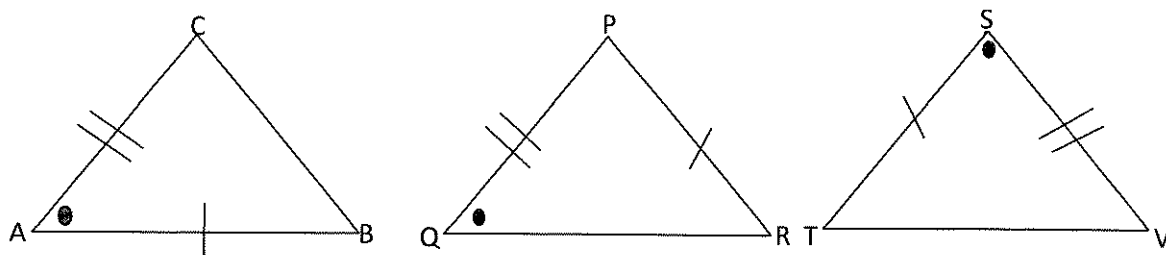
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(3)

6.2 State which triangle is congruent to  $\triangle ABC$ .

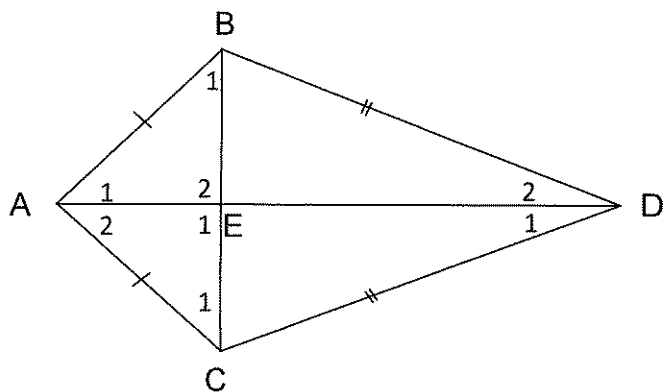


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(2)

6.3



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

6.3.1 Prove that  $\triangle ABD \equiv \triangle ACD$ .

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(4)

6.3.2 Prove that  $\triangle ABE \equiv \triangle ACE$

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(4)

6.3.3 Prove that  $\hat{E}_1 = \hat{E}_2 = 90^\circ$ .

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(3)

6.3.4 Hence, state the relationship between AE and BC.

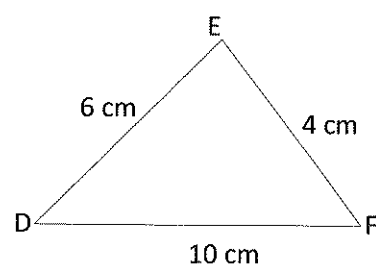
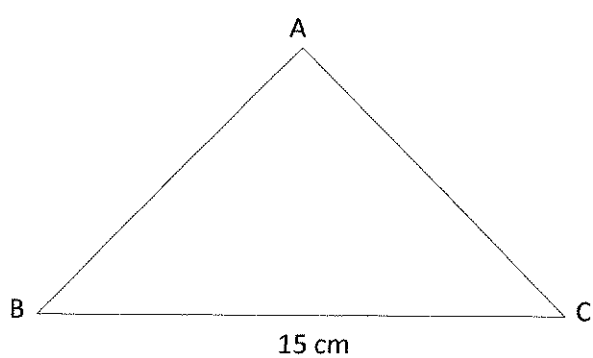
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(1)

6.4 Calculate the length of AB if  $\triangle ABC \parallel \triangle EDF$ :




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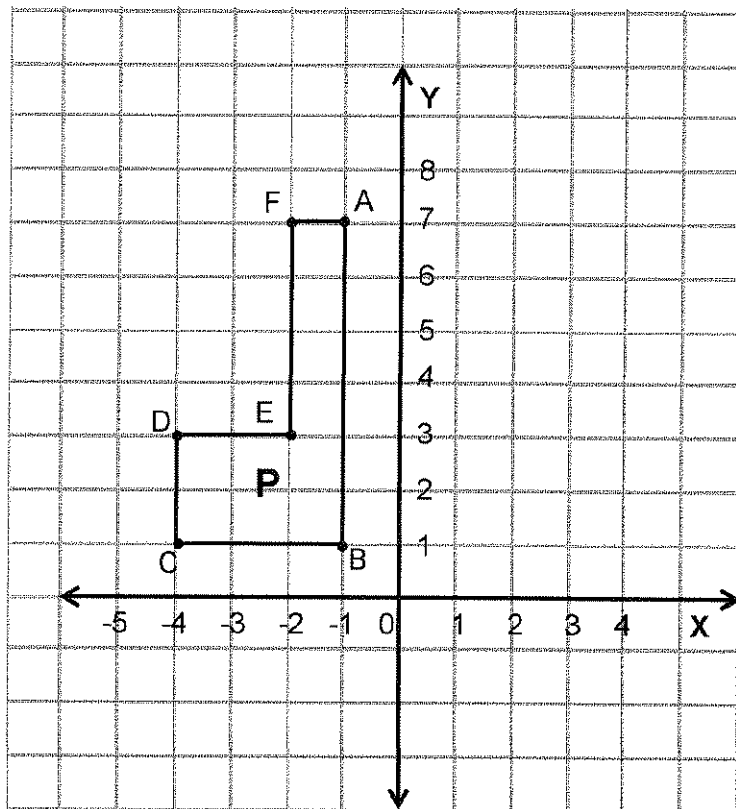


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(4)  
[27]

### QUESTION 7

A, B, C, D, E and F are the vertices of figure P.



- 7.1 Write down the coordinates of the image of D and E if figure P is translated 3 units to the right and 2 units down.

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(2)

- 7.2 Write down the coordinates of the image of A and B if figure P is reflected in the Y-axis.

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(2)

- 7.3 The length of each side of figure P is halved. Calculate the perimeter of the new figure.

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(2)

- 7.4 Determine the ratio of the area of figure P to the area of the reduced figure in question 7.3.

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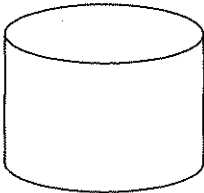
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(2)  
[8]

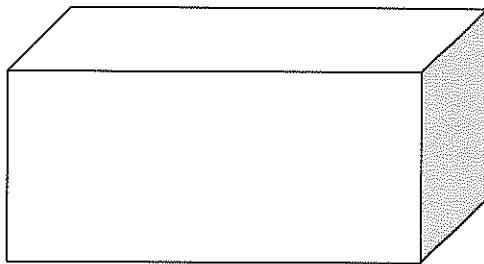
QUESTION 8

8.1 Complete the table by filling in the name of the 3-D figure, the number of faces, the number of vertices, the number of edges and the shape of the faces.

3-D figure	Name of figure	No. of faces	No. of vertices	No. of edges
				
Shape of the faces:				

(6)

- 8.2 Calculate the total surface area of the rectangular prism with length =  $7,2\text{ m}$ , breadth =  $5\text{ m}$  and height =  $3,32\text{ m}$ .  
Give the answer correct to 2 decimal places.



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(5)

- 8.3 A bottling company produced a cylindrical can which has a capacity of  $1\text{ l}$ .  
The radius of the cylinder is  $2,82\text{ cm}$ . Calculate the height of the can correct to 1 decimal place. ( $1\text{ l} = 1\,000\text{ cm}^3$  and  $\pi = 3,14$ )

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(4)  
[15]

## QUESTION 9

- 9.1 The following marks were obtained by a Grade 9 class for a Mathematics test out of 50.

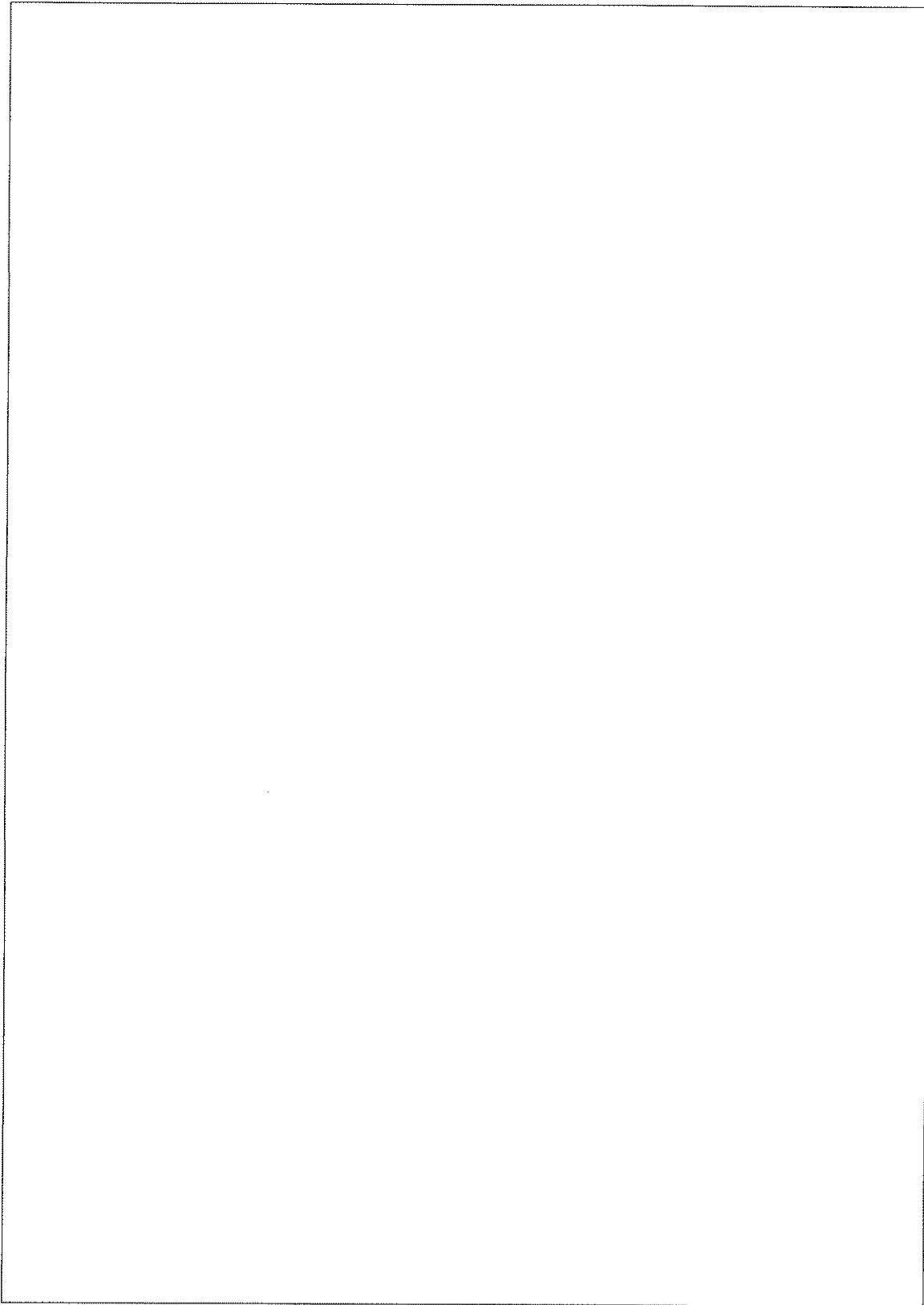
14	21	29	32	36	43
41	17	43	31	38	35
32	29	27	23	36	25
22	26	40	28	47	30
24	46	25	44	42	39

- 9.1.1 Complete the frequency table.

Class interval	Tally marks	Frequency
1 – 10		
11 – 20		
21 – 30		
31 – 40		
41 – 50		

(4)

9.1.2 Draw a histogram to illustrate the data.



(4)

9.2 Vuvu recorded the following data from her class about their shoe sizes.

Girls	5	7	7	5	5	7	5	5	8	6	
Boys	5	6	9	8	7	9	9	10	5	9	8

9.2.1 Write down the range and the median for the boys.

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(2)

9.2.2 Write down the mode (modal size) for the girls.

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(1)

9.2.3 Calculate the mean size for the girls.

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(2)  
[13]

**TOTAL: 140**