TEACHERS WITHOUT BORDERS PROGRAMME

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In Bill Gates words, at the Mandela Day 'Living Together' address: "Maintaining the quality of this country's higher education system while expanding access to more students will not be easy. But it's critical to South Africa's future" – working together, we can help achieve this."

Contributing schools to date:

Clifton School	Milnerton High	Rustenburg Girls' High	St Peter's
Durban Girls'	Northwood High	St Anne's DC	St Stithians
Fairmont High	Roedean	St John's DSG	Wynberg Boys' High
Herzlia High	Rondebosch Boys'	St Mary's DSG Kloof	Wynberg Secondary

MATHEMATICS

10 June 2014   **2 HOURS**

Grade 8

150 MARKS

<u>**Instructions:**</u>

1. <u>**NO CALCULATORS ARE ALLOWED!!!**</u>
2. There are TWO sections in this exam. Answer BOTH sections.
3. There are 11 questions. Answer all the questions.
4. Show all working.
5. **Answer QUESTION 1 and QUESTION 2 on the answer sheet. Staple the answer sheet to the front of your answers.**
6. Number your answers exactly as the questions are numbered on the exam paper.
7. Use <u>**only**</u> blue or black pens.

SECTION A

QUESTION 1

For each of the following questions choose the correct answer. Make a cross (X) over the letter **(i.e. A, B, C, D)** which corresponds to your answer on **the answer sheet provided.**

1.1   Which statement is true?

      A. All integers are natural numbers.
      B. All real numbers are rational numbers.
      C. All integers are real numbers.
      D. All non-real numbers are irrational numbers.

1.2   Calculate $\sqrt{144+25}$

      A. 17
      B. 13
      C. 7
      D. −7

1.3   The complement of $63°$ is:

      A. $27°$
      B. $117°$
      C. $297°$
      D. $7°$

1.4 $x + 2x =$
      A. $3x^2$
      B. $2x^2$
      C. $3x$
      D. x^3

1.5 $3(a + b) =$
      A. $3ab$
      B. $3a + b$
      C. $3a + 3b$
      D. $3 + a + b$

1.6   What is the value of the expression $3x - 4$ when $x = 5$?
A. 9
B. 11
C. 3
D. -5

1.7   Replace the $*$ with the correct sign: $-15 * -3$
A. $<$
B. $=$
C. $>$
D. $\geq$

1.8 $0,36$ as a common fraction is:
A. $\frac{1}{4}$
B. $\frac{3}{6}$
C. 36
D. $\frac{9}{25}$

1.9 $\frac{5}{8}$ as a percentage is:
A. 58%
B. 37,5 %
C. 62,5%
D. Not possible

1.10 $\frac{0 \times 1}{1 \times 1} =$
A. 1
B. 0
C. Undefined
D. ½

[10]

QUESTION 2

Complete the following table by placing a ✓ in the appropriate column. **Answer this question on your answer sheet**.

Number		Natural	Integer	Rational	Irrational	Real
2.1	3					
2.2	$\sqrt{25}$					
2.3	$\dfrac{22}{7}$					
2.4	$3,\dot{1}\dot{2}$					
2.5	$2,315\ldots$					

[5]

QUESTION 3

3.1   From the list of numbers below, choose a number that:

$$8 \quad 13 \quad 14 \quad 18 \quad 24 \quad 49 \quad 77$$

3.1.1 is a multiple of 2 and 3   (1)

3.1.2 is a perfect square   (1)

3.1.3 is a prime number   (1)

3.1.4 is a factor of 24   (1)

3.1.5 is the square root of 169   (1)

3.1.6 is the Highest Common Factor of 48 and 72   (1)

3.2   Express 360 as a product of its prime factors.   (3)

[9]

QUESTION 4

Evaluate each of the following. Show all your working out:

4.1 $2 - 4(2 - 7)$ (2)

4.2 $(4^2 \times 2 - \sqrt{64}) \div 3$ (3)

4.3 $\dfrac{1\frac{1}{2} + 3\frac{3}{4}}{\frac{3}{8} - \frac{1}{4}}$ (6)

                                                                                                                              [11]

QUESTION 5

Examine the following algebraic expression:

$$7y^2 + \frac{y^5}{3} - 6y + 2$$

5.1   How many terms are there in the expression?   (1)

5.2   Write down the coefficient of y^5.   (1)

5.3   Write down the constant term.   (1)

5.4   Rearrange the expression in descending powers of y.   (2)

5.5   If $y = -1$ calculate the value of the expression.   (3)

                                                                                                                              [8]

QUESTION 6

Simplify:

6.1 $a + a + a$ (1)

6.2 $a \times a \times a$ (1)

6.3 $-5a - 3a + 2a$ (1)

6.4 $-3a^2 - (-5a^2)$ (2)

6.5 $-4x \times 2x^2$ (2)

6.6 $3a^3b^2 \times (-5ab^4)$ (3)

6.7 $(-2a^3b^4)^2$ (3)

6.8 $3x^2y - 12y^2x + 7xy^2$ (2)

6.9 $-3(x - 2) - 4(2x + 3)$ (4)

6.10 $\dfrac{20x^6y}{5x^2y^3}$ (3)

6.11 $\dfrac{x^2 + 4x^2}{10x^2}$ (2)

6.12 $\sqrt{64a^8e^{10}}$ (3)

6.13 Use columns to add $2a - c + b$ to $3a + 3b + 3c$ (3)

                                                                                     [30]

QUESTION 7

7.1   Write algebraic expressions for the following:

7.1.1   A number 3 more than x. (1)

7.1.2   John's age 5 years ago if he is now p years old. (1)

7.1.3   There are n number of fish in a bowl. How many fish are there in m bowls? (1)

7.1.4   Five times the square of x. (1)

7.1.5   A ticket to a movie costs x rand and a Coke costs y rand. What will it cost to treat yourself and three friends to a movie and a Coke? (2)

7.2   Solve for x :

7.2.1 $x - 6 = -20$ (1)

7.2.2 $\frac{x}{-6} = 12$ (1)

7.2.3 $2x + 5 = 5x - 7$ (3)

7.2.4 $4(x - 2) - 2(x + 1) = 4$ (4)

[15]

QUESTION 8

8.1   Complete the following statements:

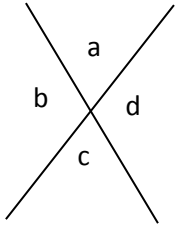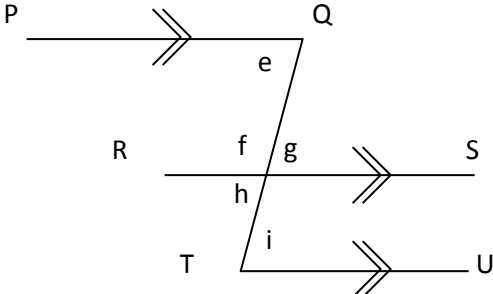8.1.1   An angle greater than 180° and less than 360° is called a(n)_____ angle? (1)
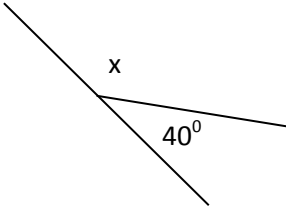
8.1.2   What is the supplement of 110°? (1)

8.1.3   What do we call a triangle that has 3 sides that are of different lengths? (1)

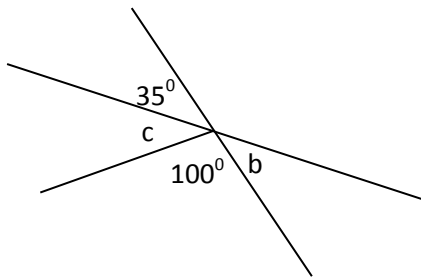8.1.4.   Together 37^0 and 53^0 are_____ angles. (1)

8.1.5   If lines are parallel, co-interior angles add up to_____° (1)

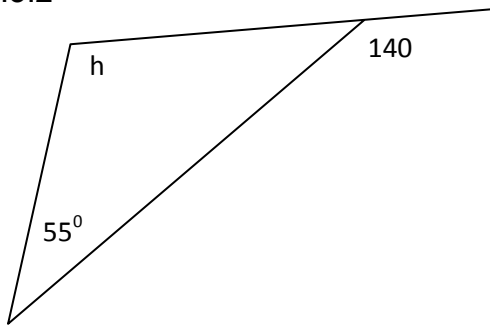8.2 For each of the following questions, **give ONLY the correct reason for the corresponding statement.**

	Statement	Reason
	$x + 40° = 180°$	8.2.1_____(1)
	$a = c$ $a + b + c + d = 360°$	8.2.2_____(1) 8.2.3_____(1)
	$e + f = 180°$ $e = g$ $i = g$	8.2.4_____(1) 8.2.5_____(1) 8.2.6_____(1)

8.3   Find the values of the variables in each of the following. **Give reasons for your answers.**

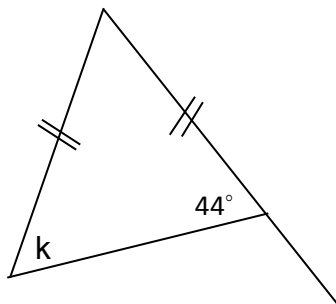8.3.1   (2)

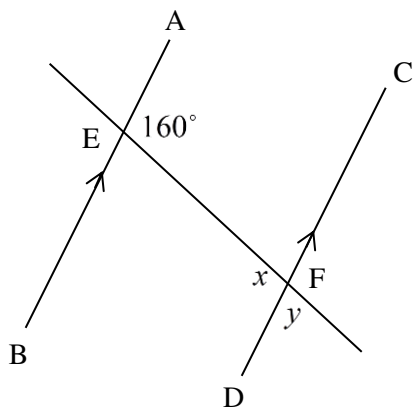8.3.2   (1)

8.3.3   (1)

8.3.4   (2)

[17]

Total Section A: 105

Section B

QUESTION 9

9.1   Simplify:

9.1.1 $\dfrac{\left(-2a^2b^4\right)^2 5ab^2}{\sqrt{100a^4}}$ (4)

9.1.2 $\dfrac{17x^6 - x^6}{2x^3} - (2x)^2 \times 2x$ (3)

9.1.3 $2ab(a^2 + b^2) - (a^3b + 2ab^3)$ (3)

9.2   Jordan spent part of his holiday climbing in the Drakensberg. On the first day
        he climbed $(3x^2 - 4xy + 7)$ metres. On the second day he climbed
        $(-2 - 2x^2 + xy)$ metres. How much further did he climb on the first day than
        on the second day?

                                                                                                                        (3)

9.3   Oliver's calculator is broken. Suggest a **short method** to help Oliver calculate
        the answer to the following: $\mathbf{2 \times 61 + 3 \times 61 + 5 \times 61.}$ Show your working and
        your answer.   (2)

9.4   If the following are true:

        $A + B + C = 160$
        $B + C = 90$
        $X + A = 90$
        Determine the value of X (3)

                                                                                                                        [18]

QUESTION 10

10.1 Solve for the unknown variable in the following:

10.1.1 $\frac{2m-12}{3} = 8$ (3)

10.1.2 $-3(6-y) + 2y^2 = 9 + 2y(y+3)$ (4)

10.1.3 $\frac{1}{2}(4x-6) = 2(x-4)$ (3)

10.2 Use an equation to answer the following:

You are trying to determine the date in April when your Maths teacher celebrates her birthday. She gives you the following clue: "My birthday is the second of three consecutive dates which add up to 72." On which date does she have her birthday? (4)
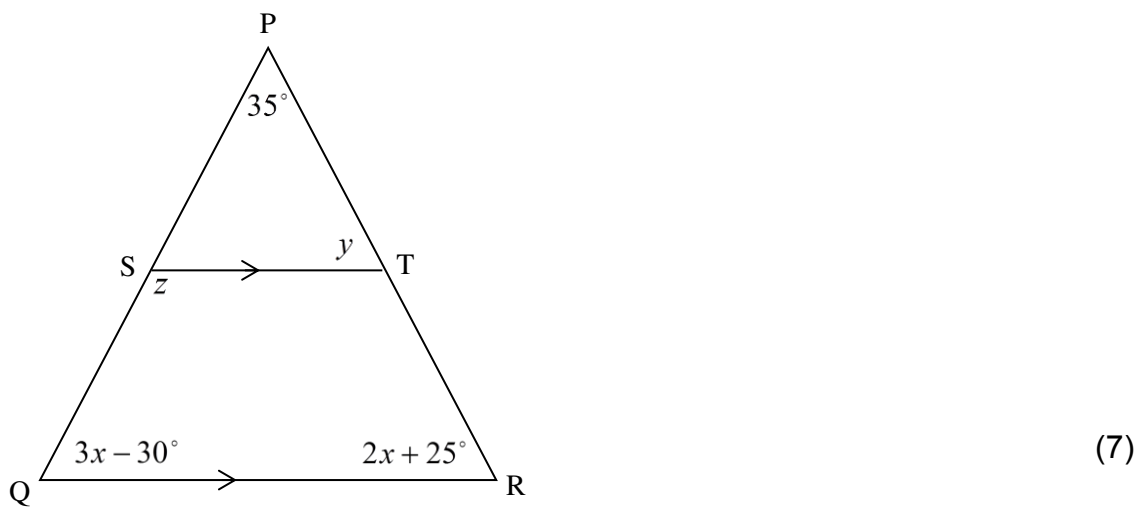
[14]

QUESTION 11

11.1   One angle is double the size of its complement. What is the size of

the larger angle? (1)

11.2   One angle measures $10°$ more than another. If these two angles are

supplementary, what is the size of the smaller angle? (1)

11.3   Calculate the values of x, y and z in the following diagram. Show all steps and

give reasons for your answers.

(7)

11.4   What is the size of the angle between the hour and minute hands of a clock

at:

11.4.1   6 pm? (1)

11.4.2   6:20 pm? *(Give the acute angle only)* (3)

[13]

Total Section B: 45

Grand total: 150

ANSWER SHEET

NAME: _____   **Teacher:_____**

Question	1	2	3	4	5	6	7	8	Total Section A	9	10	11	Total Section B	Total
Mark	10	5	9	11	8	30	15	17	105	18	14	13	45	150
Actual														

QUESTION 1

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

QUESTION 2

Number		*Natural*	*Integer*	*Rational*	*Irrational*	*Real*
2.1	3					
2.2	$\sqrt{25}$					
2.3	$\dfrac{22}{7}$					
2.4	$3,\dot{1}\dot{2}$					
2.5	$2,315\ldots$					