***KIIRA COLLEGE BUTIKI MATHEMATICS CLUB  
MATHLETICS CONTEST 2019  
INTERMEDIATE MATHLETES CATEGORY  
TIME: 3HRS: 15MINS***

***SECTION A: 5 MARKS EACH***

***Qn.1.*** If, what is ?

***Qn.2.*** The slope of a line is half the y-intercept of that very line. Through which point  
 is such a line guaranteed to pass, on a Cartesian grid?

***Qn.3.*** Without using a calculator, find the value of

***Qn.4.*** How many two digit counting numbers have their tens digit less than their ones  
 digit?

***Qn.5.*** In a multiplication example , different letters represent different  
 digits. What is ?

***Qn.6.*** Define a function as , for all Show that:

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***Qn.7.*** A conversation between two great friends, Brandon and Brian, in 1970 was as  
 follows, “ if you had been born in the year 1980, you would be 45 years in the  
 year or 2025AD”said Brandon. “that is true” retorted Brian . “But my  
 grandmother was years old in the year and she is still living!” In which year  
 was Brian’s grand born?

***Qn.8.*** The length of each side of rectangle is . What is the largest possible  
 distance around rectangle ?

***Qn.9.*** Given that but, what is the numerical value of ?

***Qn.10.*** Mr. Asher gave a five question pop challenge to his class yesterday. The   
 students were unprepared, so one guessed and got 3 questions correct. The  
 students later realized that each answered a different set of question correctly.  
 What is the largest possible numbers that are in Mr. Asher’s class?

“Moving an extra mile, going beyond limits”

***SECTION B: 10 MARKS EACH***

***Qn.11.*** Starting with one circle, Antonio draws another circle with in the first one such  
 that the radius of first circle is the diameter of the new one. He continues this  
 pattern, drawing as many circles as possible. Assuming the radius of the first  
 circle is 1unit; find the sum of the areas of an infinite series of such circles.

***Qn.12 a).*** How many different ordered pairs of positive integers satisfy:

***b).*** If and are two real numbers such that and, find  
 the sum of the reciprocals of the squares of and, correct to 3 decimal   
 places.

***Qn.13.*** In a district election, 5908 people cast their votes for four candidates. The  
 winner received 111 votes more than the second person, 119 more votes than  
 the third person, and 162 votes more than the fourth person. How many votes  
 did each person get?

***Qn.14.*** Complete the magic square below, following the instructions given.

Across: a :   
 d :

e :

Down: a : a multiple of 31  
 b : a perfect square  
 c : see e

|  |  |  |
| --- | --- | --- |
| a | b | c |
| d |  |  |
| e |  |  |

***Qn.15.*** Last week, Asher, and Ashley had the conversation below:

***Asher:*** I thought of two distinct one digit numbers. Can you guess the sum  
 of these two numbers?

***Ashley:*** No, can you give me a clue?

***Asher:*** The last digit of their product is your house number

***Ashley:*** Now, I know the sum of the two numbers.

Find the sum of the two numbers.