

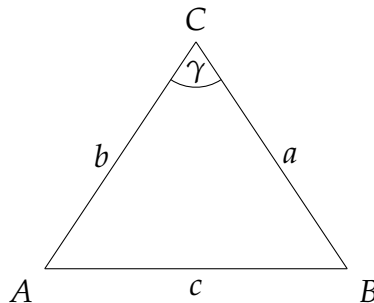
University of Bahrain  
Bahrain Teachers College  
TC2MA324: History of Mathematics  
Dr. Abdulla Eid  
Spring 2015



### Quiz 3

Name: \_\_\_\_\_

1. Consider the following triangle with sides of length  $a, b, c$ .



- (a) State AlKashi theorem (law of cosine) for the triangle above.

- (b) If the sides of the triangles are 1,1, and 2. Can you find all the angles of the triangle? how?

- (c) Can you use AlKashi theorem to prove Pythagorean theorem? Why?
2. (a) State Wilson's theorem as stated by Ibn Al-Haytham.
- (b) Apply it to verify that 8 is a composite number.
3. (a) Define what does it mean that two numbers  $a$  and  $b$  are amicable numbers (friendly numbers)?

(b) Ibn Qurra theorem states that if

$$p := 3 \cdot 2^{n-1} - 1$$

$$q := 3 \cdot 2^n - 1$$

$$r := 9 \cdot 2^{2n-1} - 1$$

where  $n > 1$ ,  $p, q, r$  are all prime number, then

$$a := 2^n \cdot p \cdot q, \quad b := 2^n \cdot r$$

are amicable numbers. Find two such pairs of amicable numbers.

4. One row of pascal's triangle containing the following coefficients:

1 13 78 286 715 1287 1716 1716 1287 715 286 78 13 1

Use the idea of Ibn AlKhayyam to produce the row immediately following this row in Pascal's triangle.