

**BRITISH COLUMBIA SECONDARY SCHOOL
MATHEMATICS CONTEST, 2008**

Junior Final, Part B

Friday, May 2

1. Find the coordinates of the point on the line $4x + 3y = 12$ that is closest to the origin.
2. The altitude h of a triangle is increased by a length m . By how much must the length of corresponding base b be decreased so that the area of the new triangle is equal to one half of the area of the original triangle?
3. Consider the sequence $a_1, a_2, a_3, \dots, a_n, \dots$ where

$$a_1 = 2, a_2 = 2 + \frac{1}{a_1}, a_3 = 2 + \frac{1}{a_2}, \dots, a_n = 2 + \frac{1}{a_{n-1}}$$

- (a) Find the values of a_2, a_3 , and a_4 .
 - (b) As n gets really big, a_n approaches the real number a . Find a .
4. If x is a positive integer and the tens digit of x^2 is odd, then what are the possible values for the ones digit of x^2 ?
 5. Five points $ABCDE$ are equally spaced around a circle and a line segment is drawn from each point to the other four points.
 - (a) What is the smallest angle formed at each point?
 - (b) How many triangles are formed?