# BRITISH COLUMBIA SECONDARY SCHOOL MATHEMATICS CONTEST, 2022

Junior Final, Part B

Friday, May 6

1. Find all the points (x, y) with $y = 3$ that form an isosceles triangle with $A(0,0)$ and $B(5,0)$.

2. In a generous mood, David gave half of his money to Jim. Jim then gave one quarter of the money he then had to David. Each of them ended up with 75 dollars. How much money did each have to start with?

3. Find the highest possible value of $n = a^2 + 1902 = b^2 + 2022$ where a and b are positive integers.

4. An ant crawls from corner A to corner B in a $5\,\text{m} \times 7\,\text{m} \times 8\,\text{m}$ room. Calculate the shortest distance it can crawl.
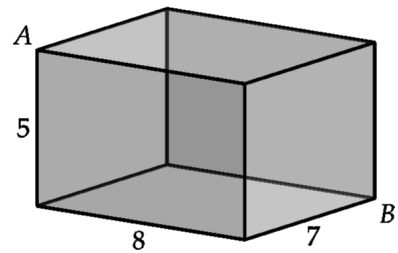
5. Alice, Betty and Carol are competing with each other in a series of math tests. After each test, x points were awarded to the person with the highest score on the test, y points were awarded for the second-highest score, and z points were awarded for the third highest score. There are no ties in test scores and x, y and z are distinct positive integers with $x > y > z$. Alice scored a total of 20 points, Betty scored a total of 10 points, and Carol scored a total of 9 points.

   (a) Prove that there had to be exactly 3 math tests.

   (b) If Betty placed first in the Algebra test, who placed second in the Geometry test? Explain how you know.