BRITISH COLUMBIA SECONDARY SCHOOL MATHEMATICS CONTEST, 2019

Junior Final, Part B

Friday, May 3

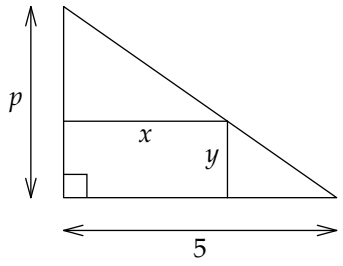
1. There are 20 people in a math class. Each person is in either grade 8 or grade 9. The average grade of the grade 8 students is 80% and the average grade of the grade 9 students is 90%. If the average grade of all the students is 84%, determine the number of grade 9 students in the class.

2. Place the numbers 1 through 10 in the empty squares in the diagram, so that the sums of the rows and the columns are as indicated. Justify why your answer is unique.

0			0	13
				17
				25
15	6	24	10	

3. Each of Xaviera, Yolanda and Zeke picks an integer greater than or equal to 1 and less than or equal to 9. Xaviera multiplies her number by 12, and then adds Yolanda's number. They multiply the result by 10. To this number they add their three original choices. The result is 878. What must have been their chosen integers?

4. A rectangle of width x and height y is inscribed in a right triangle of width 5 and height p, as shown in the diagram. Given that the rectangle has area 6, find the value of x that makes p as small as possible.



5. For any given integer n, define $n! = 1 \times 2 \times 3 \times \cdots \times n$. For example, $5! = 1 \times 2 \times 3 \times 4 \times 5 = 120$. Determine the smallest positive integer n for which $n!$ is divisible by 10^{100}.