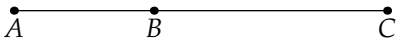
BRITISH COLUMBIA SECONDARY SCHOOL MATHEMATICS CONTEST, 2019

Junior Final, Part A

Friday, May 3

1. On the line segment AC shown, $AB = 12$ and $AB : BC = 3 : 5$.



The length of AC is:

(A) 16 (B) 20 (C) 24 (D) 32 (E) 60

2. A statistician found the average of 43 numbers to be x. Then, by accident, she included the value x with the original numbers, and found the average of the resulting 44 numbers to be y. The ratio of y to x is:

(A) $\frac{43}{44}$ (B) $\frac{44}{43}$ (C) $\frac{45}{44}$ (D) $\frac{44}{45}$ (E) 1

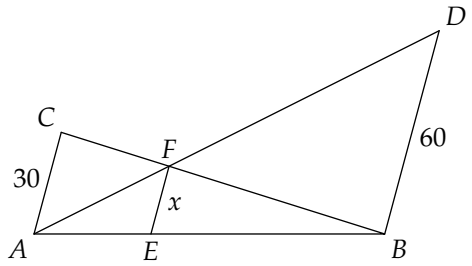
3. A skydiver jumps from a plane. She falls at a constant speed of 180 km/h until, half way down to the ground, she opens her parachute. After that she falls at a constant speed of 20 km/h. The total time for her descent is 5 minutes. The height of the plane when she jumped was:

(A) 3 km (B) 3.6 km (C) 4 km (D) 4.2 km (E) 10 km

4. If AC, BD, and EF are parallel, then the value of x is:

(A) 10 (B) 15 (C) 20

(D) 30 (E) 45



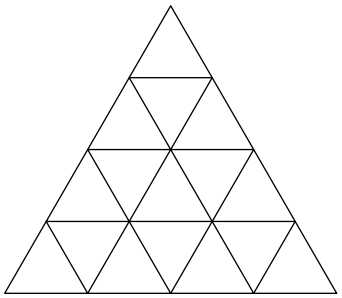
5. In a barter society among fruit growers, a lemon and 3 apples can be exchanged for 2 peaches, and an apple and 4 lemons can be exchanged for 3 peaches. The number of peaches that could be exchanged for 11 lemons is:

(A) 7 (B) 8 (C) 9 (D) 10 (E) 11

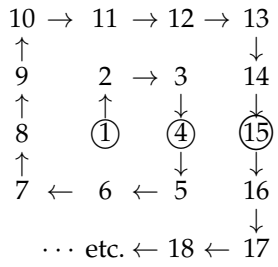
6. There are 27 equilateral triangles in the diagram. The largest has area 16. The sum of the areas of all 27 equilateral triangles is:

(A) 61 (B) 83 (C) 87

(D) 88 (E) 92



7. The numbers $1, 2, 3, \ldots$ are arranged in the "spiral square" pattern shown. The numbers in the row $1, 4, 15, \ldots$ are circled. The 6^{th} circled number in this sequence is:



(A) 90 (B) 92 (C) 94

(D) 96 (E) 98

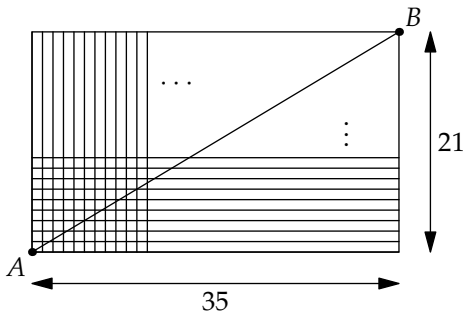
8. A detective questions four suspects about a crime. He takes the following statements:

Allistair: "Boris or Carmen did it."
Boris: "Allistair or Davina did it."
Carmen: "I did it."
Davina: "I didn't do it."

The 100% accurate lie-detector test indicates that three of the suspects are lying, and one of them is telling the truth. Unfortunately, the results are scrambled and it is impossible to tell which suspect is telling the truth. The crime was committed by:

(A) Allistair (B) Boris (C) Carmen (D) Davina (E) can't be determined

9. A 21×35 rectangle is drawn on a grid of 1×1 squares, with vertices on intersections of the grid lines. (Not all the grid lines are shown in the diagram). A diagonal AB is drawn. The number of squares that the line segment AB will cross (the interior, not just a corner) is:



(A) 42 (B) 48 (C) 49

(D) 55 (E) 56

10. Five bags contain red and green candies as follows:

Bag A contains 2 red and 3 green candies.
Bag B contains 2 red and 4 green candies.
Bag C contains 3 red and 3 green candies.
Bag D contains 3 red and 4 green candies.
Bag E contains 5 red and 4 green candies.

You plan to take two candies at random from one of the bags. The bag that gives the highest probability that these two candies will be the same color is:

(A) Bag A (B) Bag B (C) Bag C (D) Bag D (E) Bag E