BRITISH COLUMBIA SECONDARY SCHOOL MATHEMATICS CONTEST, 2010

Junior Preliminary

Wednesday, March 31

1. The value of $(100+98+96+\cdots+4+2)-(1+3+5+\cdots+97+99)$ is:

   (A) 0 (B) 50 (C) 100 (D) 147 (E) None of these

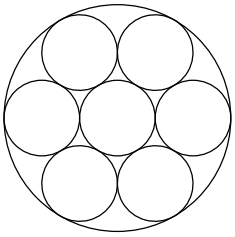
2. The simplified form of $\dfrac{\frac{1}{2}+\frac{1}{3}}{\frac{1}{3}+\frac{1}{4}}$ is:

   (A) $\frac{7}{10}$ (B) $\frac{7}{5}$ (C) $\frac{5}{7}$ (D) $\frac{10}{7}$ (E) 2

3. The product of a certain two-digit number and its reversal (the number with the same digits in reverse order) is 1855. The sum of the digits in the number is:

   (A) 8 (B) 9 (C) 10 (D) 11 (E) 12

4. A large circular window contains seven identical smaller windows, as shown. If the circumference of the large window is 3 metres, then the total perimeter of the large circle plus the seven smaller ones is:

   (A) $\frac{7\pi}{2}$ (B) 7π (C) $\pi\left(3+3\sqrt{3}\right)$

   (D) 7 (E) 10

5. If 3 pears and 2 apples cost 92 cents while 3 apples and 2 pears cost 83 cents, then the cost in cents of 1 pear and 1 apple is:

   (A) 35 (B) 36 (C) 38 (D) 39 (E) 40

6. The product of the repeating decimals $2.\overline{3}$ and $3.\overline{6}$ is:

   (A) $8.\overline{5}$ (B) $8.\overline{4}$ (C) $8.2\overline{8}$ (D) $6.1\overline{8}$ (E) $5.\overline{9}$

7. The even positive integers are multiplied together, as in $2\times4\times6\times\cdots\times n$, where n is some even integer, until the product is divisible by 2010. The value of n is:

   (A) between 101 and 111 (B) between 111 and 121 (C) between 121 and 131

   (D) between 131 and 141 (E) bigger than 141

8. If a and b are integers such that $a^2+4b^2=25$, then the total number of pairs (a,b) that satisfy the equation is:

   (A) 2 (B) 4 (C) 6 (D) 8 (E) 10

9. The sum of the first n positive integers is

$$1+2+3+\cdots+n=\frac{n(n+1)}{2}$$

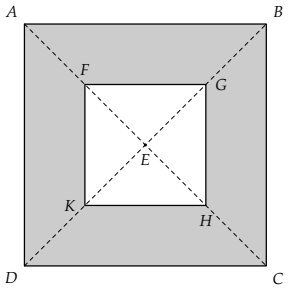
Then the sum of all positive integers less than 2010 that are not divisible by 3 is:

(A) 1345695 (B) 1346700 (C) 1347705 (D) 1437150 (E) 1450000

10. A rectangle whose side lengths are an integral number of metres has an area of 24 square metres. The perimeter of the rectangle measured in metres could **not** possibly be:

(A) 28 (B) 20 (C) 22 (D) 24 (E) 50

11. In the diagram, $ABCD$ is a square. Point E is the centre of square $ABCD$ and F, G, H, and K are the midpoints of the segments AE, BE, CE, and DE, respectively. The ratio of the area of the unshaded region to that of the shaded region is:



(A) $1:\sqrt{2}$ (B) $1:\sqrt{8}$ (C) 1 : 3

(D) 1 : 4 (E) None of these

12. One of Jerry and Kelly tells lies on Mondays, Tuesdays and Wednesdays, and tells the truth on the other days of the week. The other lies on Thursdays, Fridays and Saturdays, and tells the truth on the other days of the week. At noon one day, the two had the following conversation:

Jerry: I lie on Saturdays.
Kelly: I will lie tomorrow.
Jerry: I lie on Sundays.

The day of the week on which this conversation takes place is:

(A) Monday (B) Wednesday (C) Thursday (D) Saturday (E) Sunday