BRITISH COLUMBIA SECONDARY SCHOOL MATHEMATICS CONTEST, 2024

Junior Final, Part A

May 3, 2024

1. Two logs found in a wood pile are identical in every respect. If it takes 12 seconds to cut the first log into four smaller logs, then the number of seconds required to cut the second log into five smaller logs is:

    (A) 14   (B) 15   (C) 16   (D) 18   (E) 20

2. A trombone has been broken! Three students are being questioned by their music teacher. They each make comments about each other. Anglin says, "Ethan is lying." Ethan says, "Xavier is lying." Xavier says "both Anglin and Ethan are lying." Who is lying?:

    (A) only Anglin   (B) only Ethan   (C) only Xavier   (D) both Anglin and Ethan

    (E) both Anglin and Xavier

3. If all the numbers from one to one million are printed, then the number of times the digit 5 will appear is:

    (A) 100,000   (B) 200,000   (C) 500,000   (D) 600,000   (E) 1,000,000

4. In Clyde's French class, each test is worth the same amount. Clyde got a 97 on his French test and raised his average from 82 to 83. In order to raise his average from 83 to 84, on the next test he must get a score of:

    (A) 96   (B) 97   (C) 98   (D) 99   (E) 100

5. Chocolates in your favourite candy store are sold in packages of 6, 9, and 20 only. The largest number of chocolates that one cannot buy is:

    (A) 29   (B) 41   (C) 43   (D) 47   (E) there is no largest number

6. The smallest possible value of the expression $\dfrac{12}{(x-1)^2+3}$ is:

    (A) 4   (B) 3   (C) 2   (D) 1   (E) none of these

7. Suppose $ABCD$ is a rectangle with coordinates $A(-1,7)$, $B(p,7)$, $C(p,-1)$ and $D(-1,-1)$, and area 120. Then p is:

    (A) 14   (B) 15   (C) 16   (D) 24   (E) 25

8. The length of each edge of a cube is increased by 50 percent. The percent increase in the surface area of the cube is:

    (A)   50   (B)   125   (C)   150   (D)   300   (E)   750

9. Madeleine was born in the 19th century (between 1800 and 1899). She was x years old on her birthday in the year x^2. On her birthday in 1875 her age in years was:

    (A)   43   (B)   49   (C)   26   (D)   69   (E)   not enough information

10. Two of the three altitudes of a right triangle are of lengths 4 and 5. The longest possible length of the third altitude is:

    (A) $\frac{20}{3}$ (B) $\frac{20}{\sqrt{41}}$ (C)   5   (D)   6   (E) $\frac{10}{3}$