BRITISH COLUMBIA SECONDARY SCHOOL MATHEMATICS CONTEST, 2018

Junior Final, Part A – Draft 3

Friday, May 4

Note: Please refer to problems by the `key:#` in the margin: these don't change when problem numbers change due to adding / re-ordering. Thanks!

key:18003 1. There are n coins in a jar. One-half of them quarters, one-third of them dimes, and one-sixth of them nickels. If ten dimes are added to the jar, the number of dimes equals the number of quarters. The value of n is:

(A) 10 (B) 20 (C) 30 (D) 60 (E) 120

key:17069 2. There are n students in a gym class. Each is wearing a shirt (either red or blue) and shorts (also either red or blue). There are exactly 10 students wearing a red shirt, exactly 12 students wearing red shorts, and exactly 14 students wearing a shirt the same color as their shorts. The smallest possible value of n is:

(A) 16 (B) 18 (C) 20 (D) 22 (E) 24

key:00000 3. Some girls are standing in a circle. They are evenly spaced and numbered in order. The 5th girl is directly opposite the 17th girl. The number of girls in the circle is:

(A) 22 (B) 24 (C) 25 (D) 26 (E) none of these

key:18036 4. An operation $\star$ for numbers is defined as $a \star b = \dfrac{a+2b}{2}$. The value of $4 \star (2 \star 3)$ is:

(A) 5 (B) 5.5 (C) 6 (D) 6.5 (E) 7

key:18048 5. A hot dog costs half as much as a hamburger. If the price of a hot dog rises 5% and the price of a hamburger rises 10%, then the increase in cost of buying three hot dogs and three hamburgers is:

(A) $7\frac{1}{2}\%$ (B) 8% (C) $8\frac{1}{3}\%$ (D) $8\frac{1}{2}\%$ (E) 9%

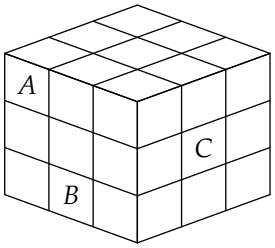
key:18026 6. You have five cubes: one red, one yellow, one green, one light blue and one dark blue. The number of ways in which the five cubes can be stacked without the blue cubes touching is:

(A) 24 (B) 48 (C) 72 (D) 96 (E) 120

key:18041 7. Given the arithmetic sequence $16, 23, 30, 37, 44, \ldots$ a new sequence is formed by subtracting 5 from each term. A number that appears in the new sequence is:

(A) 221 (B) 222 (C) 223 (D) 224 (E) 225

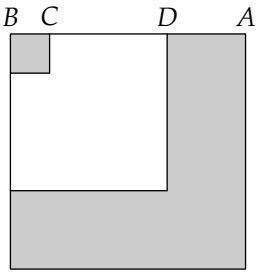
key:18057 8. A large cube is made up of 27 smaller cubes, each of length one centimetre, as shown in the diagram. If the three cubes marked A, B, and C are removed, then the total surface area (in cm^2) of the object that remains is:



(A) 60 (B) 58 (C) 57

(D) 56 (E) 54

key:18060 9. There are three overlapping squares in the diagram. Also, $BA = 2CD = 6BC$. The ratio of the shaded area to the unshaded area is:



(A) 7 : 5 (B) 6 : 5 (C) 5 : 4

(D) 5 : 6 (E) 1 : 1

key:16027 10. The total number of triangles appearing in the diagram is:

(A) 35 (B) 38 (C) 41 (D) 44 (E) 47