

# BRITISH COLUMBIA SECONDARY SCHOOL MATHEMATICS CONTEST, 2006

## Senior Preliminary Round

Wednesday March 1, 2006

1. Exactly  $57.24\overline{5724}\%$  of the people replied 'yes' when asked if they used BLEU-OUT face cream. The fewest number of people who could have been asked is:

(A) 9999      (B) 3333      (C) 1111      (D) 111      (E) 11

2. An object moved in a straight line for 8 seconds at a constant speed. It then reversed direction and travelled back along the same straight line for 3 seconds at twice its initial speed. It then reversed direction again and travelled for one second at 40% of its initial speed. If the object is 9.6 m from where it started at the end of the 12 seconds, its initial speed was:

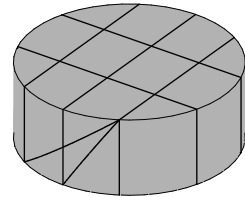
(A) 3 m/s      (B) 4 m/s      (C) 4.5 m/s      (D) 5 m/s      (E) 6 m/s

3. The value of  $(123456789)(123456789) - (123456794)(123456784)$  is:

(A) -1000      (B) -25      (C) 25      (D) 1000      (E) 125

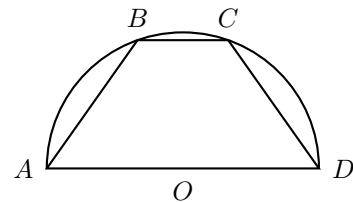
4. A cylindrical round of cheese is cut into several pieces using seven cuts. Five cuts are vertical, perpendicular to the top of the round, and two at a diagonal, as shown in the diagram. Each cut is made with a straight blade and the diagonal cuts are made through the lines formed by the vertical cuts. The total number of pieces of cheese that result is:

(A) 21      (B) 24      (C) 36  
(D) 54      (E) 60



5. The semicircle centred at  $O$  has a diameter of 6 units. The chord  $BC$  is parallel to the diameter  $AD$  and is one third the length. The area of the trapezoid  $ABCD$ , in square units, is:

(A)  $4\sqrt{2}$       (B)  $4\sqrt{5}$       (C)  $16\sqrt{2}$   
(D)  $\frac{9\sqrt{3}}{4}$       (E)  $8\sqrt{2}$



6. The difference between the sum of the first 100 positive multiples of 3 and the sum of the first 100 positive even integers is:

(A) 5000      (B) 5050      (C) 10100      (D) 2525      (E) None of these

7. The maximum number of pieces of a circular pie that can be cut by six straight cuts of a knife is:

(A) 6      (B) 7      (C) 12      (D) 16      (E) 22

8. A certain set  $S$  has 24 more subsets than a second set  $T$ . The number of elements in set  $S$  is:

(A) 2      (B) 3      (C) 4      (D) 5      (E) 6

9. Without using any number more than once, a selection of numbers from 25, 27, 3, 12, 6, 15, 9, 30, 21, and 19 gives a sum of 50. The number of numbers needed is:

(A) 3      (B) 4      (C) 5      (D) 6      (E) 7

10. If

$$x = \sqrt{2 + \sqrt{2 + \sqrt{2 + \dots}}}$$

then  $x$  is equal to:

- (A) 2                      (B)  $2 + \sqrt{2}$                       (C) 4                      (D) 6                      (E) Answer is infinite

11. There are 21 roads connecting a certain number of towns. Each road connects exactly two towns. Six of the towns can be reached by exactly three roads. The rest can be reached by exactly four roads. The number of towns in total is:

- (A) 6                      (B) 8                      (C) 10                      (D) 12                      (E) 16

12. Consider the fraction

$$\frac{1630}{4542}$$

If you swap two digits in the numerator with two digits in the denominator a fraction equalling  $\frac{1}{3}$  results. The sum of the digits in the final numerator is:

- (A) 10                      (B) 11                      (C) 12                      (D) 13                      (E) 15