

BRITISH COLUMBIA SECONDARY SCHOOL MATHEMATICS CONTEST, 2026

Senior Preliminary

March 4, 2026

- The sum of the numerical coefficients in the complete expansion of $(x^2 - 2xy + y^2)^7$ is:
(A) 0 (B) 7 (C) 14 (D) 128 (E) 128^2
- Jenny chose three different nonzero digits. Owen wrote down all the nine possible two-digit integers obtained from the digits chosen by Jenny. (For example if Jenny chooses 4, 7 and 9 then Owen writes 44, 47, 49, 74, 77, 79, 94, 97 and 99.) Assume that the sum of the integers written by Owen equals 231. The product minus the sum of the digits chosen by Jenny equals
(A) 5 (B) 1 (C) 8 (D) 4 (E) 12
- Define functions f and g as follows: for every real numbers a and b , $f(a, b) = 3a + b$ and $g(a, b) = a - 2b$. Find $g(f(3, 4), f(4, 3))$.
(A) 8 (B) -4 (C) 0 (D) 12 (E) -17
- Find the number of distinct integer solution triples (x, y, z) (positive or negative) of the equation

$$\frac{xy}{z} + \frac{xz}{y} + \frac{yz}{x} = 3.$$

- (A) 0 (B) 1 (C) 2 (D) 4 (E) 5
- Recall that for a positive integer n , one defines $n!$ by
$$n! = 1 \times 2 \times 3 \times \cdots \times n$$
where $n!$ is called n factorial. For example, $3! = 1 \times 2 \times 3 = 6$ and $5! = 1 \times 2 \times 3 \times 4 \times 5 = 120$. Determine the remainder when $1! + 2! + 3! + \cdots + 2026!$ is divided by 7.
(A) 0 (B) 1 (C) 2 (D) 4 (E) 5
 - Five people are accused of a robbery, but only one is guilty. Each gives a statement, but exactly two of the statements are false. This is enough to give a decisive answer. What single person is guilty?
Alex: It was Ben.
Ben: Alex is lying.
Cindy: Dennis is innocent.
Dennis: Ellie is innocent.
Ellie: Dennis is telling the truth.

(A) Alex (B) Ben (C) Cindy (D) Dennis (E) Ellie

7. The length of a rectangle is 5 and its width is less than 4. The rectangle is folded so that two diagonally opposite vertices coincide. If the length of the crease (fold) is $\sqrt{6}$, then the width of the rectangle is:

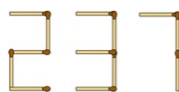
(A) $\sqrt{2}$ (B) $\sqrt{3}$ (C) $\sqrt{5}$ (D) 2 (E) $\sqrt{\frac{11}{2}}$

8. Matchsticks can form each of the ten digits as follows:



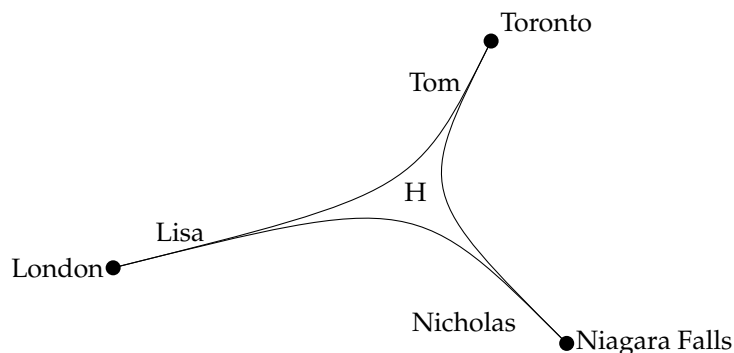
How many 3-digit odd numbers with distinct digits can be formed using an odd number of matchsticks in total?

For example



is a 3-digit odd number with distinct digits formed using an odd number of matchsticks.

- (A) 220 (B) 92 (C) 116 (D) 184 (E) 154
9. Rail lines through Hamilton (H) connect London, Toronto, and Niagara Falls as shown. In London, Lisa counts 190 incoming and outgoing trains in total. Similarly, Tom counts 208 trains in Toronto, and Nicholas counts 72 trains in Niagara Falls. Assuming that no train starts, ends, or reverses direction in Hamilton, how many trains traveled between London and Niagara Falls (in either direction)?



- (A) 35 (B) 27 (C) 48 (D) 21 (E) 30
10. Find $\sin 30^\circ + \sin 300^\circ + \sin 3000^\circ + \cdots + \sin (3 \times 10^{1000})^\circ$.
- (A) $\frac{1}{2} + 997\frac{\sqrt{3}}{2}$ (B) 0 (C) $\frac{1}{2} - \frac{\sqrt{3}}{2}$ (D) 500 (E) $225(1 + \sqrt{3})$
11. A right triangle with legs 3 cm and 4 cm is rotated around its hypotenuse. Determine the volume of the formed solid of revolution.
- (A) $5\pi \text{ cm}^3$ (B) $\frac{16\pi}{3} \text{ cm}^3$ (C) $\frac{64\pi}{9} \text{ cm}^3$ (D) $12\pi \text{ cm}^3$ (E) $\frac{48\pi}{5} \text{ cm}^3$

12. In a town, there are only 2 types of residents: Those who only tell the truth and those who only tell lies. 150 residents fill out a questionnaire. Below are the results of the questionnaire. How many residents always lie?

Question	Number of answers "Yes"
Are you under 18 years old?	68
Are you from 18 to 35 years old?	45
Are you from 36 to 65 years old?	52
Are you over 65 years old?	75
Do you have kids?	72

- (A) 23 (B) 30 (C) 45 (D) 75 (E) 86