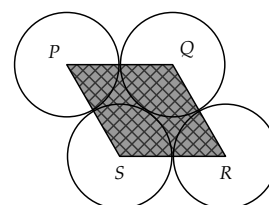


BRITISH COLUMBIA SECONDARY SCHOOL MATHEMATICS CONTEST, 2013

Junior Preliminary

Wednesday, April 3

- A boy named Danny has the same number of brothers as sisters and twice as many sisters as any of his sisters has. The number of brothers and sisters, including Danny, in Danny's family is:
(A) 3 (B) 4 (C) 5 (D) 6 (E) 7
- The number of ways to arrange four students in a row to have their picture taken is 24. The number of ways to arrange five students in a row is:
(A) 24 (B) 29 (C) 30 (D) 60 (E) 120
- Decorative lanterns are strung together for a wedding in the following pattern: red, red, green, green, green, red, red, green, green, green, ..., with the pattern continuing for every five lanterns. The position of the 121st red lantern is:
(A) 200 (B) 201 (C) 300 (D) 301 (E) 601
- Pat can mow the lawn in 15 hours. Pat's brother works at one half the rate that Pat works, whereas, Pat works at one half the rate at which his sister works. If Pat's brother and sister work together to mow the lawn, each with their own lawn mower, the number of hours it will take them to complete the job is:
(A) 15 (B) 7.5 (C) 10 (D) 30 (E) 6
- Four identical circles of radius one with centres at points P , Q , R , and S are arranged to touch one another as illustrated. The area of the shaded quadrilateral $PQRS$ is:
(A) $2\sqrt{3}$ (B) 4 (C) $4\sqrt{3}$
(D) $3\sqrt{3}$ (E) 2π
- The number of right triangles with sides of lengths $\sqrt{n+1}$, $\sqrt{n+2}$, and $\sqrt{n+3}$ is:
(A) 0 (B) 1 (C) 2 (D) 3 (E) unbounded
- Melvin and Rascal have each created new linear temperature scales. On the Melvin scale, water freezes at 5° Melvin and boils at 45° Melvin. On the Rascal scale, water freezes at 50° Rascal and boils at 110° Rascal. The temperature on the Melvin scale when the temperature reads 74° Rascal is:
(A) 11° (B) 13° (C) 21° (D) 31° (E) 41°



8. Alice, Bob, Carla, Dick and Emily are playing a game in which each is either a frog or a moose. A frog's statement is always false, while a moose's statement is always true. The players make the following statements:
- (a) Alice says that Bob is a moose.
 - (b) Carla says that Dick is a frog.
 - (c) Emily says that Alice is not a frog.
 - (d) Bob says that Carla is not a moose.
 - (e) Dick says that Emily and Alice are different kinds of animals.

The number of players who are frogs is:

- (A) 0 (B) 1 (C) 3 (D) 4 (E) 5
9. The simplified form of the expression $1 - \frac{1}{1 - \frac{1}{1 - \frac{1}{2013}}}$ is:
- (A) $-\frac{1}{2012}$ (B) 2013 (C) -2011 (D) $\frac{1}{2013}$ (E) -2012
10. If $(2^a)(9^b) = 2a9b$, where $2a9b$ is a four digit number with a and b as the hundreds and ones digits, respectively, the value of $a + b$ is:
- (A) 5 (B) 6 (C) 7 (D) 8 (E) 9
11. Suppose that a and b are two positive integers with the same number of digits for which their average is obtained by writing them side by side and placing a decimal point between them, to form the number $b.a$. For any two such numbers a and b , with $a > b$, it must be true that:
- (A) $a - b = 1$ (B) $\frac{a}{b} = \frac{5}{4}$ (C) $\frac{a}{b} = \frac{4}{5}$ (D) $a + b = 9$ (E) $a - b = 50$

12. A vertical rectangular post with horizontal top $ABCD$ has $AB = 11$ cm and $BC = 8$ cm. Points $P, Q, R,$ and S are chosen on the post vertically below $A, B, C,$ and $D,$ respectively, so that the slice, $PQRS,$ through the post is a parallelogram. If $AP = 33$ cm, $BQ = 56$ cm, and $CR = 47$ cm, then the length of DS is:

- (A) 24 (B) 32 (C) 44
(D) 48 (E) 52

