

BRITISH COLUMBIA SECONDARY SCHOOL MATHEMATICS CONTEST, 2011

Senior Preliminary

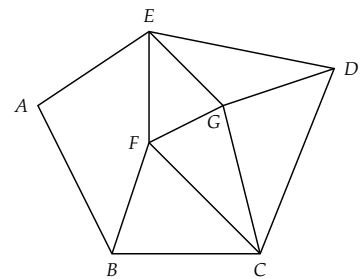
Wednesday, March 30

1. The base of a triangle is increased by 10%, while the altitude perpendicular to that base is decreased by 5%. The area of the triangle is:

(A) increased by 5% (B) increased by 0.5% (C) decreased by 0.5%
(D) increased by 4.5% (E) decreased by 5%

2. Alan the road inspector wishes to travel the grid of roads shown. He would like to travel all the roads exactly once in one continuous trip. One point where he could begin his trip is:

(A) A (B) B (C) E
(D) F (E) G

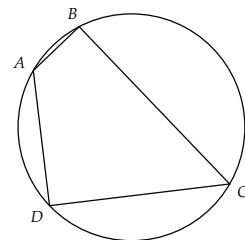


3. A cevian is a line segment that joins a vertex of a triangle and a point on the opposite side that is not a vertex. If eight cevians are drawn from one vertex of a triangle the number of triangles formed, counting the original triangle, is:

(A) 9 (B) 28 (C) 36 (D) 45 (E) 90

4. The quadrilateral $ABCD$ is inscribed in a circle, as shown. If $\overline{AB} = 14$, $\overline{BC} = 48$, $\overline{CD} = 30$, and $\overline{DA} = 40$, the area of the quadrilateral is:

(A) 936 (B) $240\sqrt{14}$ (C) 1650
(D) 2500 (E) Cannot be determined



5. The correct answer to an arithmetic problem is given below, together with four incorrect answers. The total number of letters, not counting the hyphens in all of the incorrect answers for the problem is:

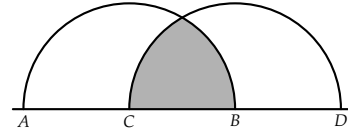
(A) Thirty (B) Thirty-one (C) Thirty-four (D) Fifty-four (E) Forty-three

6. A large cube is formed by gluing together 64 smaller identical cubes. Each of the smaller cubes is painted either all black or all white. The large cube is formed in such a way that no two visible faces of the same colour are adjacent to each other. The maximum possible number smaller cubes that are painted black is:

(A) 28 (B) 32 (C) 36 (D) 55 (E) 56

7. The radii of the two semicircles with centres at B and C are both $2\sqrt{3}$. The shaded area common to both semicircles is:

- (A) 2π (B) $4\pi - 3\sqrt{3}$ (C) $4\pi - \frac{3}{2}\sqrt{3}$
(D) $4\sqrt{3}$ (E) 4π

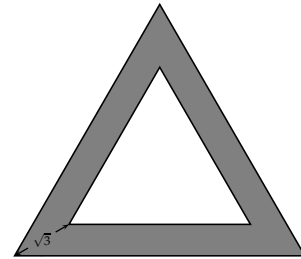


8. A point (x, y) is randomly selected within the rectangle with vertices at $(0, 0)$, $(3, 0)$, $(3, 5)$, and $(0, 5)$. The probability that the y -coordinate of the selected point is less than the x -coordinate is:

- (A) $\frac{3}{10}$ (B) $\frac{2}{5}$ (C) $\frac{7}{15}$ (D) $\frac{3}{5}$ (E) $\frac{7}{10}$

9. An equilateral triangle with side length 5 is placed inside a larger equilateral triangle in such a way that the sides of the inner and outer triangles are parallel and the distance between each pair of corresponding vertices is $\sqrt{3}$. (See the diagram.) The area of the shaded region between the two triangles is:

- (A) $\frac{39}{2}$ (B) $12\sqrt{3}$ (C) $\frac{39\sqrt{3}}{4}$
(D) $\frac{25\sqrt{3}}{4}$ (E) $\frac{30 + 3\sqrt{3}}{4}$



10. A bug following the line $4x + 3y = 60$ wants to move to the line $4x + 3y = 120$. The shortest distance that she can travel to get from one line to the other is:

- (A) 60 (B) 5 (C) 15 (D) 20 (E) 12

11. A ball was floating in a lake when the lake froze over. The ball was later removed without breaking the ice, leaving an indentation in the ice 48 cm across and 6 cm deep. The radius of the ball in centimetres is:

- (A) 24 (B) 36 (C) 48 (D) 51 (E) 96

12. One hundred straight cuts are made across a circular pizza, but not necessarily through the centre of the pizza. The maximum possible number of pieces of pizza that results is:

- (A) 10101 (B) 201 (C) 5050 (D) 10100 (E) 5051