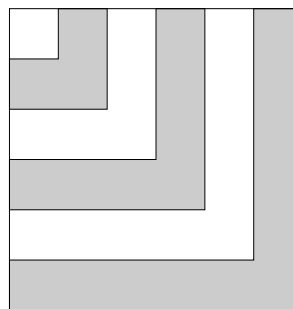


BRITISH COLUMBIA SECONDARY SCHOOL MATHEMATICS CONTEST, 2023

Junior Preliminary

April 2023

1. Two sides of a 6 cm by 6 cm square are divided into equal parts to construct the shaded and unshaded regions shown below. The ratio of shaded to unshaded area is



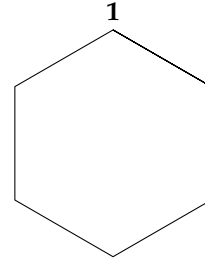
- (A) 3 : 1 (B) 5 : 3 (C) 7 : 5
(D) 3 : 2 (E) 6 : 5
2. Consider a hockey league with 7 teams. Each team plays exactly n games within the league. It is not possible for n to be:
(A) 4 (B) 7 (C) 12 (D) 14 (E) 18
3. You have 50 coins (some quarters, the rest nickels) worth a total of \$6.10. The number of nickels is:
(A) 52 (B) 47 (C) 42 (D) 37 (E) 32
4. Given the sequence 3, 12, 21, 30, 39, . . . , which of the following is in the sequence?
(A) 9990 (B) 9993 (C) 9994 (D) 9996 (E) 9999
5. Mary tells a secret to 6 people. Each of them tells 5 more new people. Each of them tells 4 more people. Each of them tells 3 more, each of whom tell 2 more, each of whom tells one more. At this point, how many people know the secret?
(A) 1957 (B) 720 (C) 1237 (D) 873 (E) 1593
6. Oliver has a basket of colored eggs. There are exactly 4 blue eggs, plus some number of red and another number of white eggs. Oliver is blindfolded, and told to take eggs out of the basket one at a time. To be certain of getting at least one white egg, he must take out 44 eggs. How many must he take out to be certain of getting at least one egg that isn't red?
(A) 5 (B) 22 (C) 39 (D) 40 (E) 44
7. You have a digital clock that shows hours and minutes, but not seconds. At one point you glance at it, and you see that the time is 1:15. Exactly 40 seconds later you glance at it again, and it says 1:16. Exactly 90 seconds after that, you glance at it again, and it says 1:17. If you glance at it again 20 seconds later, what is the probability that it will say 1:18?
(A) 0 (B) $\frac{1}{3}$ (C) $\frac{1}{2}$ (D) $\frac{2}{3}$ (E) 1

8. Suppose $a < b < c < d < e$ are the weights of 5 pumpkins. Weighed two at a time, the weights of the pairs are 3, 5, 6, 8, 9, 11, 12, 13, 15, and 18. Then $c =$?

(A) 3.5 (B) 4 (C) 4.5 (D) 5 (E) 5.5

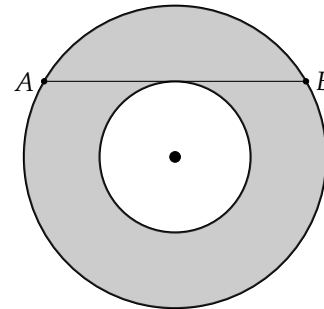
9. Determine the number of ways to position the numbers 1 through 6 on the corners of a hexagon, one number per corner, so that consecutive numbers aren't placed on adjacent corners. For example, the numbers 2 and 4 can't be on corners that connect to the corner with 3 on it. Two ways to position numbers are considered the same if one be rotated to arrive at the other. Mirror images are not considered the same.

(A) 6 (B) 8 (C) 10
(D) 12 (E) 14



10. Two circles with the same centre are shown below. Chord AB of the outer circle has length 12 and it touches the inner circle at only one point. The area of the shaded part is

(A) 6π (B) 36π (C) 72π
(D) 144π (E) 48π



11. Two ferry boats move back and forth at constant speeds across a river (taking no time to switch directions). They start at opposite sides of the river and meet 700 metres from the west side of the river. They finish their initial crossings, turn around, and meet again 400 metres from the east side of the river. The width of the river in meters is:

(A) 1000 (B) 1300 (C) 1500 (D) 1700 (E) 2100

12. Suppose $\frac{\frac{1}{x} + \frac{1}{y}}{\frac{1}{x} - \frac{1}{y}} = 2023$. What is $\frac{x+y}{x-y}$?

(A) 2023 (B) -2023 (C) 1 (D) $\frac{1}{2023}$ (E) $-\frac{1}{2023}$