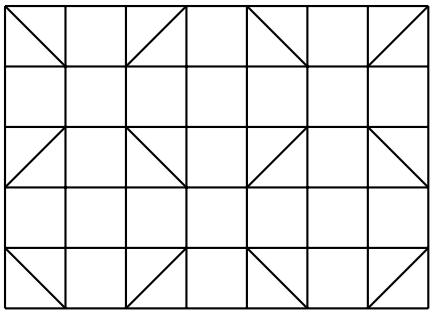
# GRADES 11 AND 12

## SAMPLE QUESTION FOR 3 POINTS

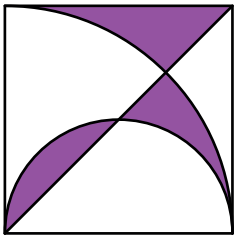
Beaver wishes to color the squares and triangles of the following figure so that no two neighboring shapes, even those sharing a single vertex, are the same color. What is the least number of colors he needs?



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

## SAMPLE QUESTION FOR 4 POINTS

A diagonal, a semicircle, and a quarter-circle are drawn in a square of side 6 cm. What is the area, in $\text{cm}^2$, of the shaded part?



(A) 9 (B) $3\pi$ (C) $6\pi - 9$ (D) $\frac{10\pi}{3}$ (E) 12

## SAMPLE QUESTION FOR 5 POINTS

A special four-digit number $\overline{abcd}$ satisfies the equation $\overline{abcd} = a^a + b^b + c^c + d^d$. What is the value of $a$?

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