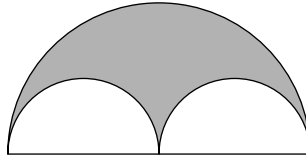


Level 2 Placement Quiz

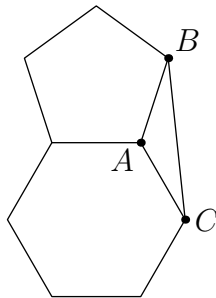
1. Given that m and n are the roots of $7x^2 + 9x + 21 = 0$, find $(m + 7)(n + 7)$.
2. Three semicircles are drawn, as shown below. The arc length of the largest semicircle is 12π , and the two small semicircles are congruent. Find the area of the shaded region.



3. Find the number of 3-digit numbers that are divisible by 7.
4. Find the smallest positive integer n so that $720n$ is a perfect cube.
5. A convex quadrilateral has two diagonals. How many diagonals does a convex 12-gon have?
6. Find

$$\sum_{n=0}^{\infty} \frac{3^n + (-2)^n}{6^n}.$$

7. Jacob, Karina, and Mark each choose a number from 1 to 5 (inclusive), at random. Find the probability that at least two people chose the same number.
8. A regular pentagon and a regular hexagon share a common side, as shown below. Find $\angle ABC$.



9. Find the least positive integer n for which both $n - 50$ and $n + 50$ are positive perfect squares.
10. Given that $(x + \frac{1}{x})^2 = 3$, find $x^3 + \frac{1}{x^3}$.