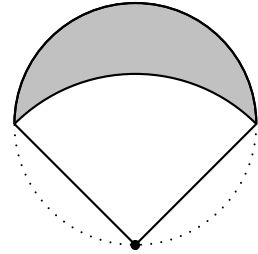


9. Given that $z^2 + z - 3 = 5$, the numerical value of $z^4 + 2z^3 - 5z^2 - 6z + 5$ is:

- (A) 14 (B) 21 (C) 64 (D) $60 - \sqrt{33}$ (E) $60 + \sqrt{33}$

10. The shaded crescent shown is bounded by a semi-circle and the arc of a second circle whose centre is on the first circle. If the second circle has radius r , then the area of the crescent is:

- (A) r^2 (B) $\frac{1}{2}r^2$ (C) πr^2
(D) $\frac{1}{2}\pi r^2$ (E) $\frac{3}{2}\pi r^2$



11. Antonino and Ricardo go swimming together at the local pool. The ratio of Antonino's swimming speed to Ricardo's is 3 : 2. Antonino and Ricardo start swimming lengths in the same lane, going in a counterclockwise rotation, up one side of the lane and the back on the other side. Ricardo takes a one quarter pool length head start, but, since Antonino swims faster, he catches up to and passes Ricardo. If Antonino swims a total of 60 lengths of the pool, the number of times that Antonino catches up to and passes Ricardo is:

- (A) 9 (B) 10 (C) 11 (D) 12 (E) 13

12. A circle is inscribed in a right triangle with sides a , b , and c , where c is the hypotenuse, as shown in the diagram. The radius of the circle is:

- (A) $\frac{1}{2}(a + b - c)$ (B) $\frac{1}{2}(a + b + c)$ (C) $\sqrt{a^2 + b^2 + c^2}$
(D) $\frac{1}{2}\sqrt{a^2 + b^2 + c^2}$ (E) $a + b - c$

