THE TWENTY-SECOND W.J. BLUNDON MATHEMATICS CONTEST*

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in cooperation with
The Department of Mathematics and Statistics
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1. An automobile went up a hill at an average speed of 30 km/hr and down the same distance at an average speed of 60 km/hr. What was the average speed for the trip?

2. Let P be a point in the interior of rectangle $ABCD$. If $PA = 9$, $PB = 4$ and $PC = 6$, find PD.

3. Find the area of the region above the x-axis and below the graph of $x^2 + (y + 1)^2 = 2$.

4. A square is inscribed in an equilateral triangle. Find the ratio of the area of the square to the area of the triangle.

5. Find the number of solutions to the equation $2x + 5y = 2005$ for which both x and y are positive integers.

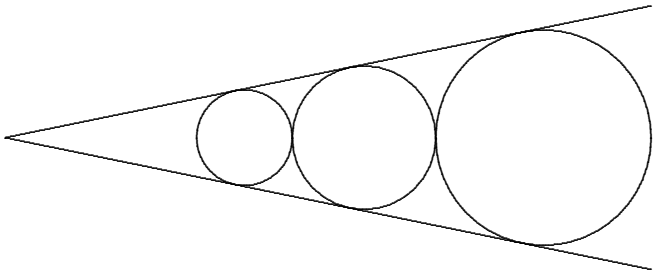
6. For what values of a does the equation $4x^2 + 4ax + a + 6 = 0$ have real solutions?

7. Ace runs with constant speed and Flash runs x times as fast, $x > 1$. Flash gives Ace a head start of y metres, and, at a given signal, they start off in the same direction. Find the distance Flash must run to catch Ace.

8. Show that $3^n - 2n - 1$ is divisible by 4 for any positive integer n.

9. If the polynomial $P(x) = x^3 - x^2 + x - 2$ has the three zeros a, b and c, find $a^3 + b^3 + c^3$.

10. A circle of radius 2 is tangent to both sides of an angle. A circle of radius 3 is tangent to the first circle and both sides of the angle. A third circle is tangent to the second circle and both sides of the angle. Find the radius of the third circle.



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