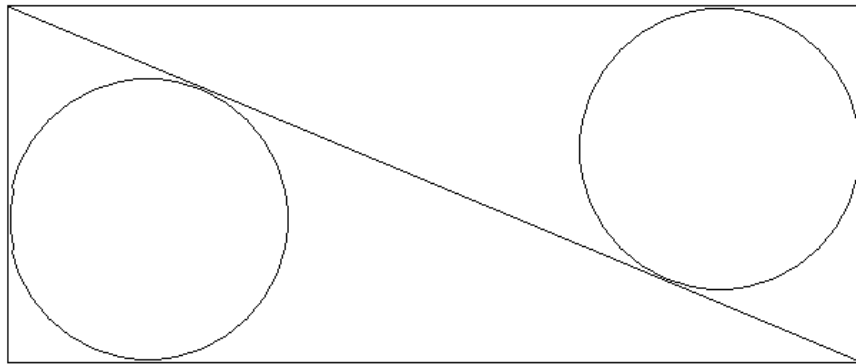


Huddle 2004

1. The rectangle below is 12×5 . The diagonal forms two triangles, and a circle is inscribed in each triangle. Find the distance between the centers of the two circles.



2. The function D , whose domain is the set of positive integers, satisfies the conditions
- (i) $D(1) = 1$,
 - (ii) $D(p) = 1$ for all prime numbers p , and
 - (iii) $D(mn) = mD(n) + nD(m)$ for all positive integers m, n .
- Evaluate $D(2004)$.
3. What is the remainder when the polynomial $p(x) = x^{1001}$ is divided by the polynomial $d(x) = x^2 - 1$?

4. Suppose $F(x, y) = \left(\frac{x}{x^2 + y^2}, \frac{y}{x^2 + y^2} \right)$. Evaluate and simplify

$$F(F(x, y)).$$