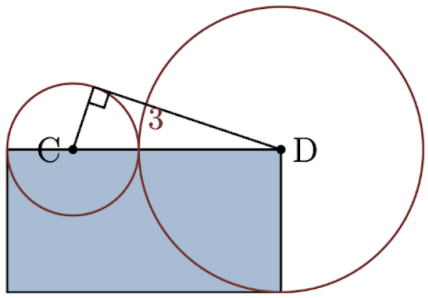
# NMSU MATH PROBLEM OF THE WEEK

Solution to Problem 4

**Fall 2026**

## Problem 4

In the picture below, C and D are the center of the smaller and the bigger of the circle, respectively. Then find the area of the blue rectangle, and justify your answer.




**Solution.** Let $r$ and $R$ denote the radii of the smaller circle (with center C) and the larger circle (with center D), respectively. Since the two circles are externally tangent, the distance between their centers is $|CD| = r+R$. The line segment of length 3 is tangent to the smaller circle at a point, call it T, forming the right triangle $\Delta CTD$ with the right angle at T. Applying the Pythagorean theorem to $\Delta CTD$, we get:

$$\begin{aligned} (r+R)^2 &= 3^2 + r^2 \\ \Rightarrow \quad r^2 + 2rR + R^2 &= 9 + r^2 \\ \Rightarrow \quad 2rR + R^2 &= 9. \end{aligned}$$

The shaded blue rectangle has the length $2r + R$ (spanning the diameter of the smaller circle and the radius of the larger circle) and the breadth $R$. Therefore, its area is:

$$\text{Area} = \text{length x breadth} = (2r+R)R = 2rR + R^2 = 9.$$

□