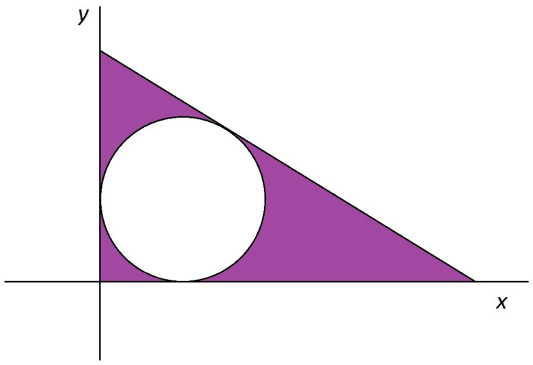
Math 124, Fall 2018, Solutions to Quiz 1

The circle with radius 5 is tangent to both coordinate axes and the slant line is tangent to the circle at the point $(8, 9)$. Find the area of the shaded region.



The center of the circle is at $(5, 5)$ from radius and tangency information.

The slope of the radial line from the center to $(8, 9)$ is $\frac{9-5}{8-5} = \frac{4}{3}$.

The slope of the tangent line is $-\frac{3}{4}$.

The equation of the tangent line is $y - 9 = -\frac{3}{4}(x - 8)$.

The x- intercept is 20, and the y-intercept is 15.

The area of the shaded region is $150 - 25\pi$.