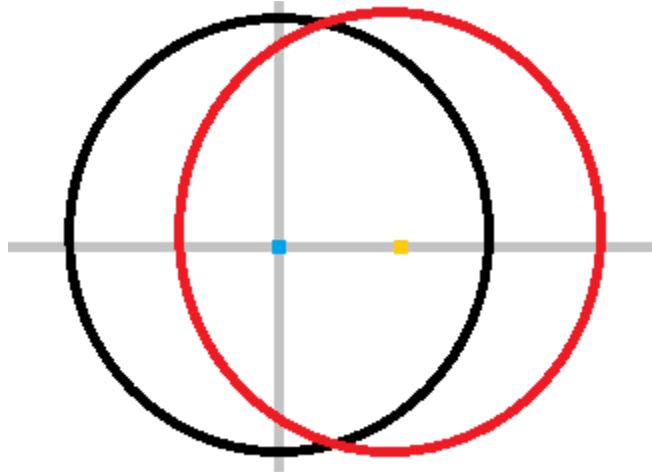


Drawing for Problem 2 in Exam3

The ordinary unit circle is drawn in black, and the translated circle with center $\frac{1}{2}$ is drawn in red; their respective centers are colored in blue and orange respectively.



Geometrically speaking, the straight line homotopy moves the circle horizontally $\frac{1}{2}t$ units to the right at time t . Note that, under the motion of this homotopy, no point of the circle goes through the origin.