and the radius is $\frac{|1-i|}{2} = \frac{1}{\sqrt{2}}$, i.e. the circle is $|z - \frac{1-i}{2}| = \frac{1}{\sqrt{2}}$

The upper circle will be $|z - \frac{1+i}{2}| = \frac{1}{\sqrt{2}}$.

7.3 # 11   Use the map $f(z) = \frac{2\pi i z}{z-2}$, Then $2 \to \infty$, $0 \to 0$, $-2 \to 2\pi i$

Since the circles only intersect at 2, the images will be parallel lines through 0 and $2\pi i$, Since $f(-1) = \frac{4}{3}\pi i$ the image lies between the lines. Thus $\exp(z)$ will map this region to a strip.

7.4 # 4   Let $f(z) = (z, z_2, z_3, z_4)$ then $f \circ T^{-1}$ maps

$T(z_2) \to 0$, $T(z_3) \to 1$, $T(z_4) \to \infty$. Thus $f(T^{-1}(z)) = (z, T(z_2), T(z_3), T(z_4))$

Now set $z = T(z_1)$

7.4 # 8   If S and T both map $z_1 \to w_1$, $z_2 \to w_2$, $z_3 \to w_3$ then

$S^{-1} \circ T$ fixes z_1, z_2, z_3. Thus $S^{-1} \circ T(z) = z$ (from previous

problem, so $T(z) = S(z)$.

7.4 # 9   Since $1, -1$ are symmetric w.r.t the imaginary axis, $f(1) = \infty$ and $f(-1)$ are symmetric w.r.t the unit circle, Thus $f(-1) = 0$.