Turn in starred problems Tuesday 01/24/2017.

Problems from Greenberg:

Section 21.2: 4 (f), 6 (b)*, 9 (e), 11 (b)*

Section 21.3: 2 (f), 9 (d), 12, 13*

Section 21.4 4 (f), 5 (g) 8 (h)*, 11 (e)*, (f)

1.A Suppose that $z = x + iy$ with $x \neq 0$. We want to find a polar angle θ for z. Explain why it is in general *not* correct to use a calculator, first computing $\dfrac{y}{x}$ and then using the inverse tangent key to find $\theta = \tan^{-1} \dfrac{y}{x}$. It might help to think about $z = -1 + i$.

1.B* Let D be the half strip $0 < x < 1$, $y < 1$ in the z plane (where $z = x + iy$), and consider the mapping $w = e^{2\pi iz}$.

(a) Determine carefully what happens to each of the straight line segments on the boundary of D under this mapping.

(b) Using (a), describe (with explanation) the image of the domain D.

Comments: 1. Problem 21.2.6(b) seems so obvious that it may be hard to see what you should do. The idea is this: for the left hand side, compute $1/z$ in the form $a + ib$, using (17) or (18), so that you know how to take its complex conjugate using equation (13). For the right hand side, find $\bar{z}$, then compute $1/\bar{z}$ using (17) or (18). Of course, the answers should agree.

2. For 21.4.4(e) your answers for the Cartesian forms should be exact (i.e., with real and imaginary parts given as integers).

Note: The problems in Section 21.2, and to some extent those of 21.4, are very routine manipulations of complex numbers. If you are already good at such manipulations these will seem rather boring; just do the ones to be turned in. But if you are not quite sure about your skills with complex arithmetic then this is a good time for a lot of practice.