

# Assignment #4

DUE *Wednesday 20 February, 2008*

**Exercises** on pages 53–54 of BROWN & CHURCHILL: # 1c, 2ab, 3c, 4, 5, 8, 9

**Exercises** on pages 59–60 of BROWN & CHURCHILL: # 1bd, 2, 3, 4, 6b, 8abc

**Exercise C4.** *Theory question.* Identify a single limit which, once proven, will allow us to show the famous rule for differentiating the exponential of a complex input:

$$f(z) = e^z \quad \implies \quad f'(z) = e^z.$$

What algebraic fact must be true of the exponential function to get this result?

**Exercise C5.** *Theory question.* Identify a single limit which, once proven, will allow us to show the famous rule for differentiating the sine of a complex input:

$$f(z) = \sin(z) \quad \implies \quad f'(z) = \cos(z).$$

What trigonometric identity (identities) must be true to get this result?