Computational Physics – HW #2

Imaginary Numbers

1. Simplify
$$\frac{3+i}{4+i} + \frac{2+i}{5-i}. \tag{1}$$
Also write this result in magnitude argument form and graph this in the complex plane.

2. Find a numerical value in $x + iy$ form for
$$3e^{2i} + 2e^{3i}. \tag{2}$$
Do this by hand and using Mathematica.

3. Use Eulers Eq. to write $cos(a + b)$ in terms of sin and cos of a and b.

4. Graph $sinh(x)$, $cosh(x)$, $tanh(x)$ over the interval $-10 < x < 10$. Mathematica may be a good choice for this.

5. From Boas, 2.16.8.

6. From Boas, 2.16.13 using Mathematica

Linear Algebra

1. From Boas 3.2.3, by hand.

2. From Boas 3.2.14 using Mathematica.

3. From Boas 3.3.2 by hand.

4. From Boas 3.3.3 using Mathematica.

5. From Boas 3.3.16 by hand or Mathematica, your choice.

6. From Boas 3.6.1 do the parts that are helpful to you by hand. Regardless of whether you did any by hand, do them all using Mathematica.

7. From Boas 3.6.6 by hand.

8. And from Boas 3.6.30, these are connected and should be done by hand.