Chapter 1. Extra Problems

X1.1 The "BAC – CAB" Rule.

(a) Show that $\mathbf{A}\times(\mathbf{B}\times\mathbf{C}) = \mathbf{B}(\mathbf{A}\cdot\mathbf{C}) - \mathbf{C}(\mathbf{A}\cdot\mathbf{B})$, (Equation 1.82).

(b) Find $(\mathbf{A}\times\mathbf{B})\times\mathbf{C}$.

X1.2 The Usefulness of Complex Numbers I.

Use the complex representation for the sine and cosine to show that

$$\sin^3\theta = \frac{3}{4}\sin(\theta) - \frac{1}{4}\sin(3\theta)$$

and

$$\cos^3\theta = \frac{3}{4}\cos(\theta) + \frac{1}{4}\cos(3\theta)$$

X1.3 The Usefulness of Complex Numbers II.

Write the cube root $\sqrt[3]{(-1)}$ as a complex number.