Chapter 1

Assignment Sheet 1

1.1

1.1.1

$$m\ddot{\vec{r}} = -m\vec{g} - 2m(\vec{\omega} \times \dot{\vec{r}}) + m\vec{\omega} \times (\vec{\omega} \times \vec{r})$$

For the earth: $\omega^2 \ll \omega$

1.1.2

Probably trivial, but:

$$\vec{\omega}' = \omega(-\cos(\phi_0), 0, \sin(\phi_0))$$

1.1.3

Trivial.

1.1.4

Trivial.

1.2

1.2.1

Trivial.

1.2.2

Trivial.

1.3

1.3.1

Trivial (differential equations).

1.3.2

Trivial.

Chapter 2

Assignment Sheet 2

2.1

2.1.1

$V_s = \frac{\sum_i m_i v_i}{\sum_i m_i}$

2.1.2

2.1.3

2.2

Gauss's law for gravity:

$$\oiint_{\partial V} \mathbf{g} \cdot d\mathbf{A} = -4\pi GM \mathbf{g} \cdot d\mathbf{A} = -4\pi GM$$

2.3

2.3.1

2.3.2