For your convenience, this document repeats the Reading and R problem information from the website.

Reading: Read the Chapter 1 Supplement to replace the beginning of §1.4. Finish Chapter 1 and start Chapter 2.

R Problems: p. 26, #1.3.6; p. 33, #1.4.2 & 1.4.3.

HI Problems:

p. 26, #1.3.1(b) with the following addition: Identify all values of $t \in [0, 2\pi]$ at which the curvature κ_g is undefined, is zero, is a maximum, or is a minimum. Then consider the graph of the cycloid (see Figure 1.3, p. 7) and the physical model for the curve (see Example 1.1.13, pp. 6-7), and explain why it makes sense that the curvature is undefined, zero, a maximum, or a minimum at those t-values.

p. 26, #1.3.4. Also consider the converse question: If $\kappa_g(t_0) = 0$, does that imply that t_0 is an inflection point? If yes, prove it; if no, give a counterexample. (Whenever you are asked a yes or no question in this course, assume "prove or give a counterexample" is implied, unless you are explicitly instructed otherwise.)

p. 27, #1.3.11.

p. 34, #1.4.4, first question only. (The second sentence makes a simple conclusion sound complicated; we'll just discuss it in class.)

p. 34, #1.4.6.

Problem S1.1. Suppose $\alpha : I \to \mathbb{R}^2$ is a regular curve such that its evolute $E(t)$ is also a regular curve on I. Prove that α is an involute to E. Caution: If you are working with a unit tangent vector, be sure to make clear whether it is the unit tangent for α or for E, and similarly for curvature and unit normals. If you are working with unit tangents (or curvature, or ...) for both curves, distinguish them with your notation.