1. Section 13.3 #6. (If you feel that you need more practice computing arc length, then do more examples from the book. The next one I would try is #15.)

2. Section 13.4 #34. (If this problem seems daunting, then you might consider doing #33 first. And the Problem A on our `curveProblemsMore.pdf` handout is a slightly gentler version of #33. Either way, you are expected to hand in just your response to #34.)

3. Problem D from the `curveProblemsMore.pdf` handout on our course web site.

4. Problems E and F from that same handout (which continue Problem D).

For this last problem, recall from an earlier class that a particle moving with velocity $\vec{v}$ in a uniform magnetic field $\vec{B}$ experiences force $\vec{F} = c\vec{v} \times \vec{B}$, where $c \neq 0$ is some constant of proportionality (which depends on the magnetic properties of the particle). You might also know that $\vec{F} = m\vec{a}$, where $m > 0$ is the particle's constant mass and $\vec{a}$ is the particle's acceleration. Let $\vec{x} : \mathbb{R} \to \mathbb{R}^3$ be the particle's trajectory through space. In other words, its position at time t is $\vec{x}(t)$.

5.A. Summarize this whole situation as a differential equation in $\vec{x}$. (A differential equation is an equation involving an unknown function and its derivatives — in this case, one or more of $\vec{x}$, $\vec{x}\,'$, $\vec{x}\,''$, etc.)

5.B. Now focus on the case where $\vec{B} = \langle 0, 0, 1 \rangle$. Write the differential equation explicitly in terms of x_1, x_2, x_3, and their derivatives.

5.C. Continuing in the case where $\vec{B} = \langle 0, 0, 1 \rangle$, find a solution $\vec{x}$. (Hint: It's probably easier to figure out what $\vec{x}\,'$ is, and then to figure out $\vec{x}$ from that. Also, if you're lost, try combinations of sines and cosines.)