The following questions were considered to be put on the exam. You should not interpret anything from them not being on the exam; just extra problems for practice.

1. Which of the following statements is true?

     I. $\mathbf{u} \cdot \mathbf{v} = \mathbf{v} \cdot \mathbf{u}$

     II. $\mathbf{u} \times \mathbf{v} = \mathbf{v} \times \mathbf{u}$

     III. $|\mathbf{u} \times \mathbf{v}| = |\mathbf{v} \times \mathbf{u}|$

     IV. $|\mathbf{u} + \mathbf{v}| = |\mathbf{u}| + |\mathbf{v}|$

     A. I. and IV. only

     B. I. and III. only

     C. II. and III. only

     D. I., II. and III only

     E. All I., II., III. and IV.

2. (a) Find the point at which the given lines intersect:

$$\mathbf{r}_1 = \langle 2, 3, 1 \rangle + t \langle 1, -2, -3 \rangle$$
$$\mathbf{r}_2 = \langle 3, -4, 2 \rangle + s \langle 1, 3, -7 \rangle$$

     (b) Find an equation of the plane that contains these lines.

3. Show that the curvature of a circle of radius R is $\kappa = 1/R$.