

# Reading Assignment # 2

Math 13 - Prof. Orellana

January 5, 2006

READ SECT. 1.6 and 1.7.

This assignment is worth 2 extra credit points. Don't forget to tell me in which page in your book you found your answer.

1. State the Cauchy-Schwarz inequality. At the beginning of the proof they say that it is "immediate" (meaning obvious) from Theorem 3.3 in page 19. Read Theorem 3.3 and tell me why it follows from this Theorem.
2. State the triangle inequality and tell me in your own words what it says. How does this relate to triangles?
3. Suppose  $A$  and  $B$  are matrices, what conditions must the matrices satisfy so that  $A+B$  is defined?
4. Suppose that  $A$  and  $B$  are matrices, what condition must be satisfied by the matrices so that  $AB$  is defined?
5. In your book they say that if  $A$  and  $B$  are two  $n \times n$  matrices  $AB \neq BA$  can you find a pair of  $2 \times 2$  matrices so that  $AB \neq BA$ , now can you find two  $2 \times$  matrices  $C$  and  $D$  so that  $CD = DC$ .
6. How does your book define a linear mapping? What is it generalizing? What properties are satisfied by a linear mapping?
7. What objects in 2D are easier to study using polar coordinates?
8. What objects in 3D are easier to study using cylindrical coordinates? What surface does  $r = 2$  represent?
9. In spherical coordinates we use the triple  $(\rho, \phi, \theta)$  to describe a point in space. What does  $\rho$ ,  $\phi$  and  $\theta$  represent and what are their possible values?
10. In spherical coordinates what surface does  $\phi = \pi/4$  represent? What about  $\phi = \pi/2$ ?