

**Math 319 - Differential Equations II**  
**Pre-Reading Assignment # 12**  
**due 10am Thu Oct 23rd, via email**

**Reading** Section 10.6, page 628 (from the paragraph starting “For problems involving circular domains...” ) to page 627 (up to Example 2).

**Questions** Answer the questions below to the best of your ability.

1. Derive equation (12).
2. Using your answer to problem #1, write down the heat equation and wave equation (both with two spatial dimensions) in polar coordinates.
3. Try using our usual separation of variables approach to solve the heat equation in polar coordinates. What problem do you run into?