# Math 330 Reading Questions

Sections 1.1 − 1.2

NAME

*Answer the following questions as you read the textbook. This sheet will be collected at the beginning of class on Tuesday. Your answers will be graded for completeness.*

1. What is **thermal energy density**? What units could you use for this quantity?

2. The heat energy in a rod changes only as a result of what two processes?

3. What is the physical interpretation of **heat flux** $\phi(x, t)$? What are possible units for this quantity?

4. The text gives the equation

$$\frac{d}{dt} \int_a^b e \, dx = \phi(a, t) - \phi(b, t) + \int_a^b Q \, dx.$$

Explain what each of the four terms in this equation represents.

5. What theorem allows the text to say $\phi(a,t) - \phi(b,t) = -\int_a^b \frac{\partial \phi}{\partial x} dx$?

6. What is the relationship between thermal energy and temperature? (Give a formula.)

7. What is Fourier's law of heat conduction?

8. Write down at least one form of the heat equation.