7. [7 points] Determine whether the following improper integral converges or diverges. Circle your final answer choice. Fully justify your answer including using proper notation and showing mechanics of any tests you use.

$$\int_{1}^{\infty} \frac{t^2 - \ln(t)}{t^4 + 8t + 10} \, dt.$$ 

_Circle one:_

- Converges
- Diverges

8. [5 points] Fully evaluate the following integral:

$$\int x \ln x \, dx$$

You do not need to simplify your answer.