

7. [12 points] Each of the following integrals is improper. For each, carefully determine its convergence or divergence by using the comparison test. Be sure to indicate what you are using for your comparison and all steps that allow you to conclude convergence or divergence of the given integral. Mathematical precision is important in this problem.

a. [6 points]  $\int_1^{\infty} \frac{3 + \sin \phi}{\phi} d\phi$

b. [6 points]  $\int_0^1 \frac{dz}{\sqrt{z^3 + z}}$