

5. [14 points]

a. [7 points] Determine whether the following improper integral converges or diverges.

Fully justify your answer including using **proper notation** and showing mechanics of any tests you use.

$$\int_0^1 \frac{3}{x + x^{1/2}} dx$$

b. [7 points] **Compute** the value of the following improper integral if it converges. If it does not converge, use a **direct computation** of the integral to show its divergence. Be sure to show your full computation, and be sure to use **proper notation**.

$$\int_1^\infty \frac{2 + 2e^x}{(x + e^x)^{3/2}} dx$$