7. [8 points] Suppose that f(x) is a differentiable function, defined for x > 0, which satisfies the inequalities $0 \le f(x) \le \frac{1}{x}$ for x > 0. Determine whether the following statements are always, sometimes or never true by circling the appropriate answer. No justification is necessary.

a. [2 points]
$$\int_{1}^{\infty} f(x)dx$$
 converges.

Always Sometimes Never

b. [2 points] $\int_{1}^{\infty} (f(x))^{2} dx$ converges.

Always Sometimes Never

c. [2 points] $\int_0^1 f(x)dx$ converges.

Always Sometimes Never

d. [2 points] $\int_{1}^{\infty} e^{f(x)} dx$ converges.

Always Sometimes Never