7. [8 points] Suppose that $f(x)$ is a differentiable function, defined for $x > 0$, which satisfies the inequalities $0 \leq f(x) \leq \frac{1}{x}$ 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] $\displaystyle\int_1^\infty f(x)\,dx$ converges.

<div align="center">

Always   **Sometimes**   **Never**

</div>

b. [2 points] $\displaystyle\int_1^\infty (f(x))^2\,dx$ converges.

<div align="center">

Always   **Sometimes**   **Never**

</div>

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

<div align="center">

Always   **Sometimes**   **Never**

</div>

d. [2 points] $\displaystyle\int_1^\infty e^{f(x)}\,dx$ converges.

<div align="center">

Always   **Sometimes**   **Never**

</div>