9. [12 points] For the following, $f(x) > g(x) > 0$ and a is a positive constant. Indicate if each is true or false by circling **True** or **False**. For each, include **one sentence** to explain your answer.

a. [3 points] If $\int_1^\infty f(x)\,dx$ converges, then $\int_1^\infty f(a+x)\,dx$ must converge.

True False

b. [3 points] If $\int_1^\infty f(x)\,dx$ converges, then $\int_1^\infty (a+f(x))\,dx$ must converge.

True False

c. [3 points] If $\int_1^\infty f(x)\,dx$ and $\int_1^\infty g(x)\,dx$ both converge, then $\int_1^\infty f(x)\cdot g(x)\,dx$ must converge.

True False

d. [3 points] If $\int_1^\infty f(x)\,dx$ and $\int_1^\infty g(x)\,dx$ both converge, then $\int_1^\infty \frac{f(x)}{g(x)}\,dx$ must converge.

True False