(b) Prove the difference Rule

By part (a), we can use the Constant Multiple Rule. So for all $k \in \mathbb{R}$, $kf$ is differentiable at $x$ and $(kf)'(x) = kf'(x)$. Since $f$ and $g$ are differentiable and $-1 \in \mathbb{R}$, $-g$ is differentiable. So by applying the Sum rule, since $f$ and $-g$ are differentiable, $(f - g)'(x) = f'(x) - g'(x)$.

Q.E.D.