Let $X$ be a smooth projective variety over the real numbers and let $f : X \to X$ be a self-map. To $X$ one can associate a real manifold $X(R)$ and a complex manifold $X(C)$. $l$-adic cohomology gives a purely algebraic description of the Lefschetz number of $f|_{X(C)}$, but the Lefschetz number of $f|_{X(R)}$ is invisible to $l$-adic cohomology. I will explain how the Lefschetz number of $f|_{X(R)}$ is a motivic homotopy invariant and how a motivic version of the Lefschetz fixed-point formula for $f$ subsumes the topological fixed-point formulas for $f|_{X(C)}$ and $f|_{X(R)}$. I will then consider the situation over an abstract field and formulate an analogous refinement of the $l$-adic Grothendieck-Lefschetz trace formula.