Rates of change example

The accompanying plots below shows constant temperature T (in Kelvin) level curves as given by the ideal gas law $pV = nRT$ with $n = 0.122$ mol and $R = 0.082$ L·atm/(mol·K). With these values, we have $pV = \frac{1}{100}T$ or $T = 100pV$.
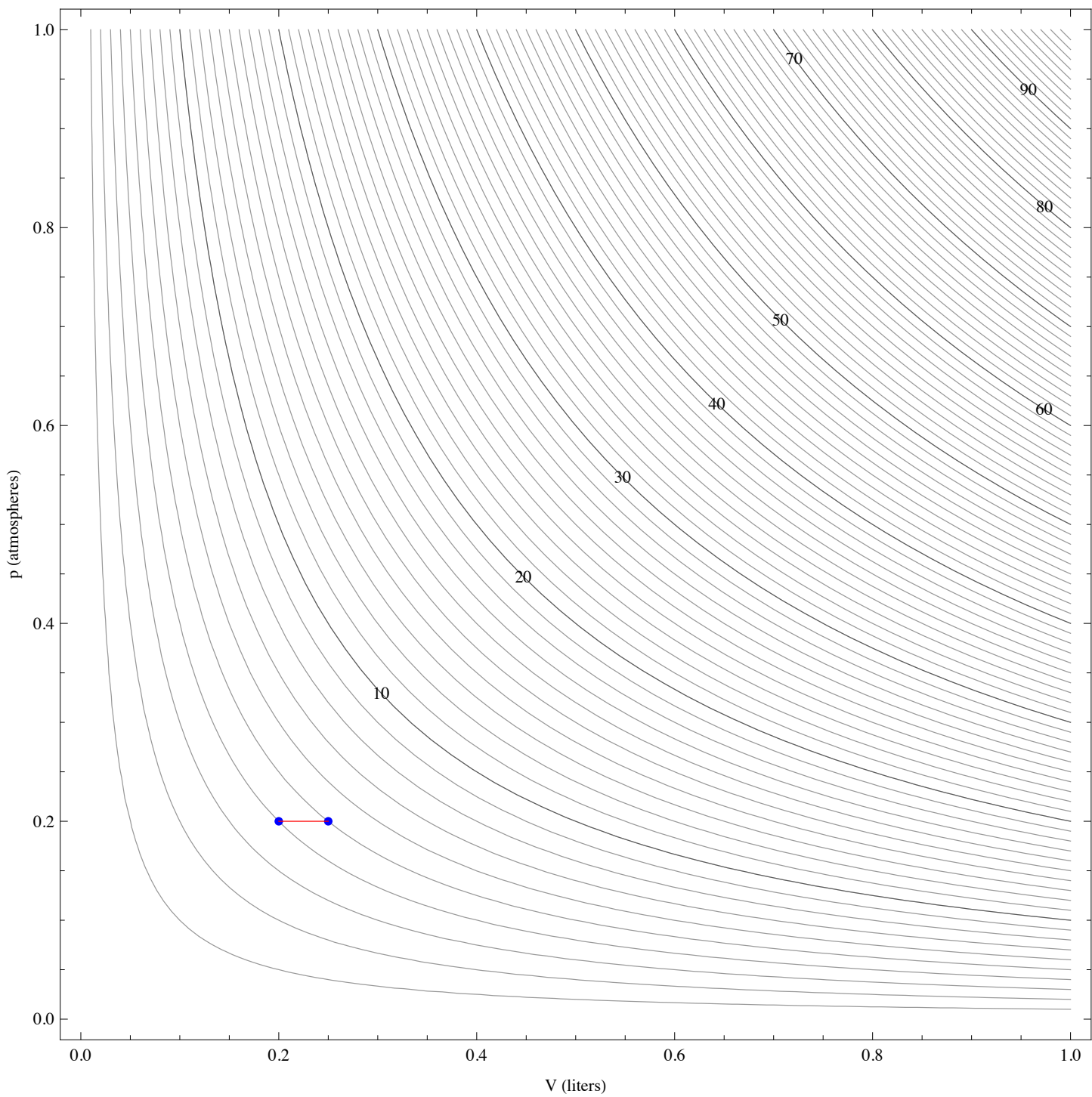
The plots on the following pages show level curves for T in the Vp-plane along with various points related to estimating the rate of change in T with respect to either V or p.
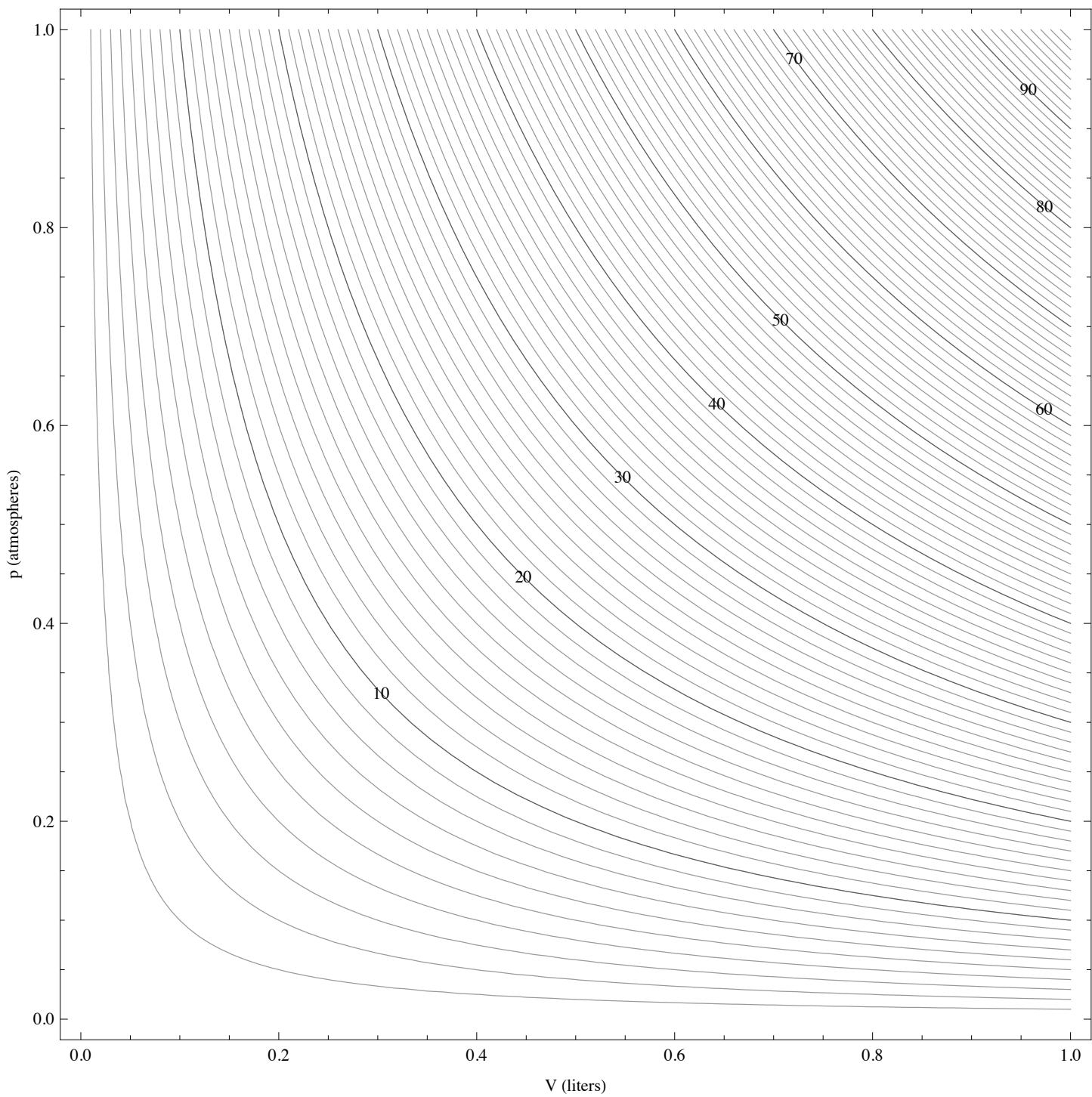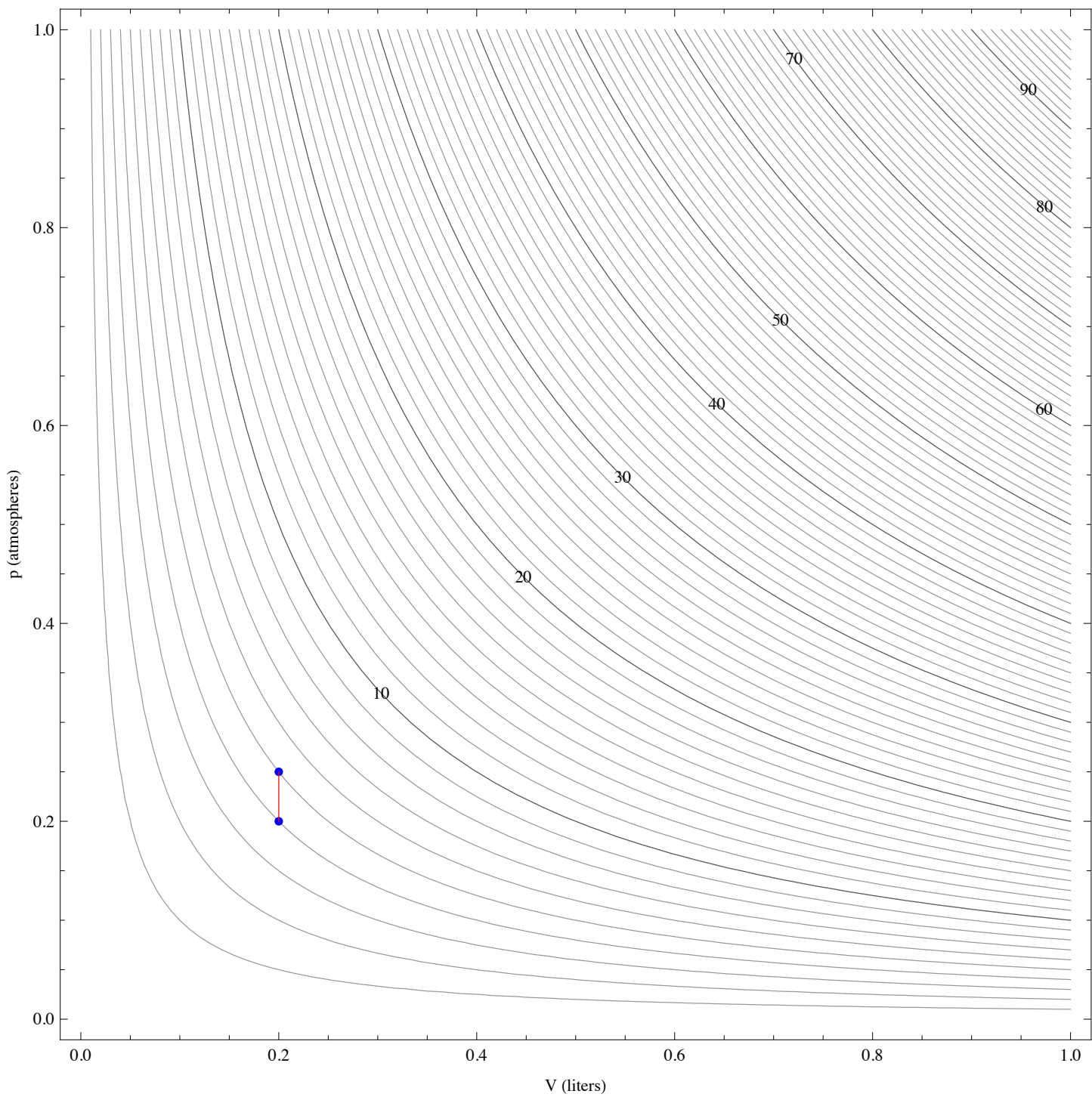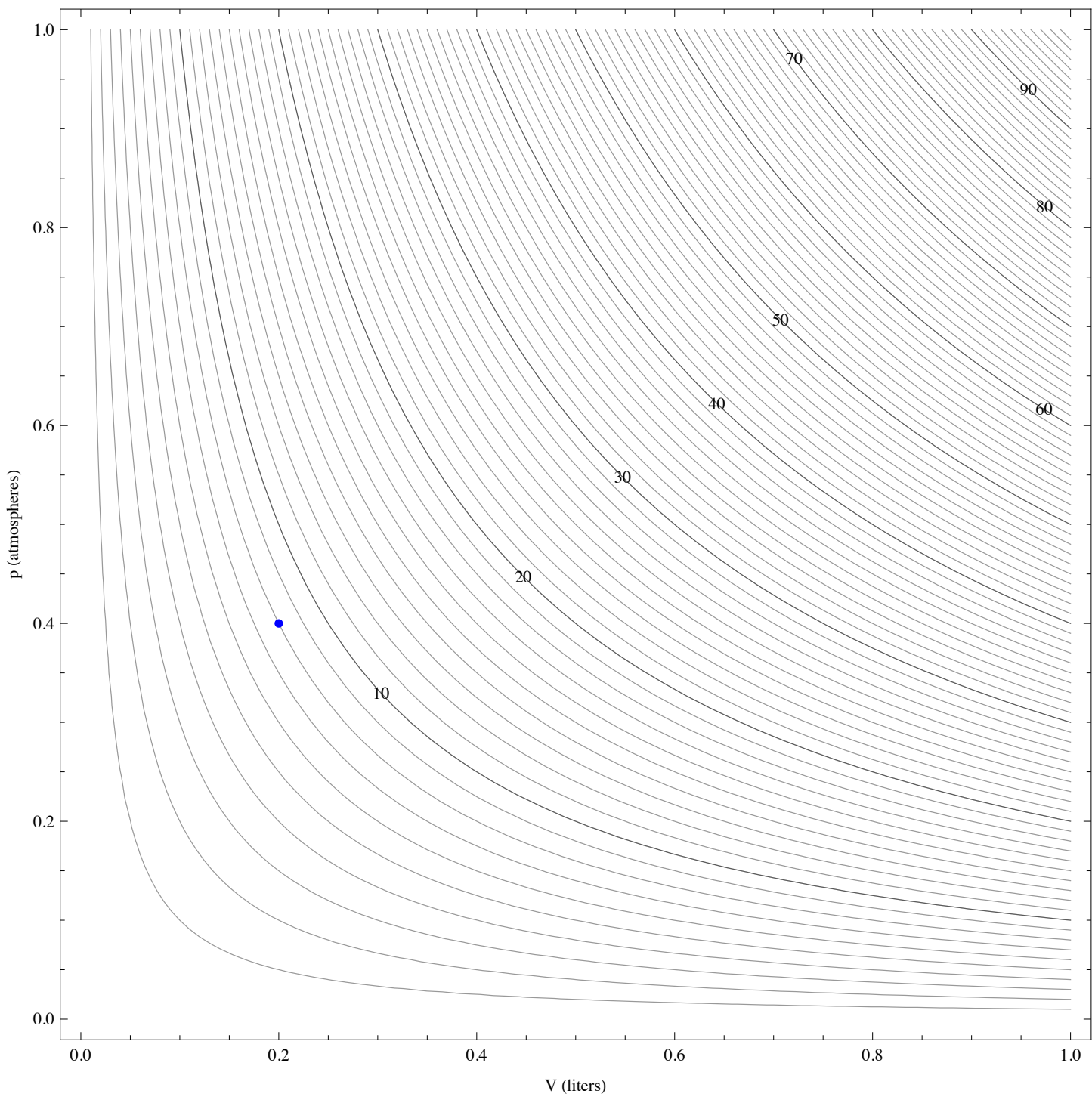
Level curves for $T = 100pV$
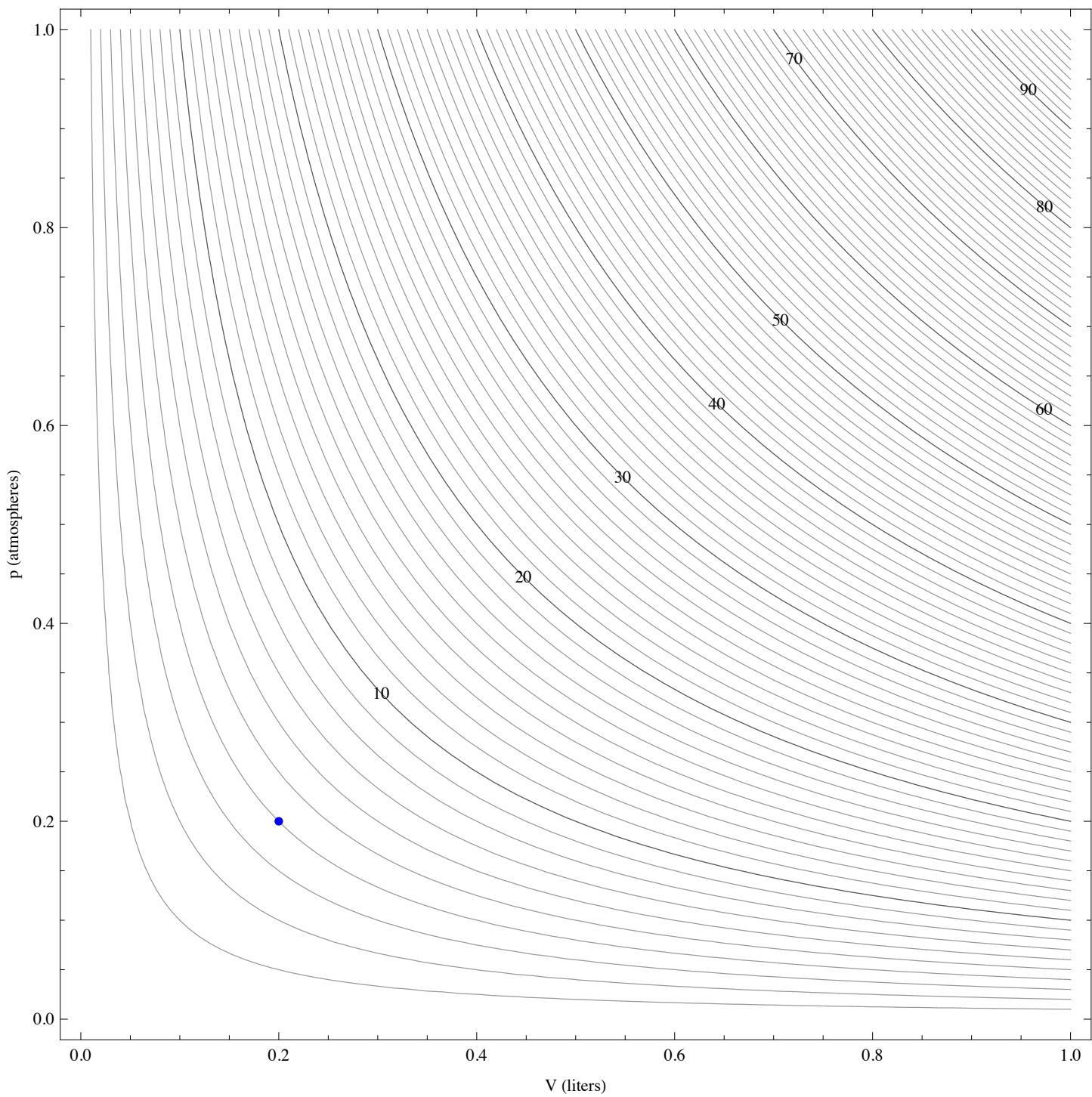
Estimate rates of change in T for $V = 0.2$ atm and $p = 0.2$ liter
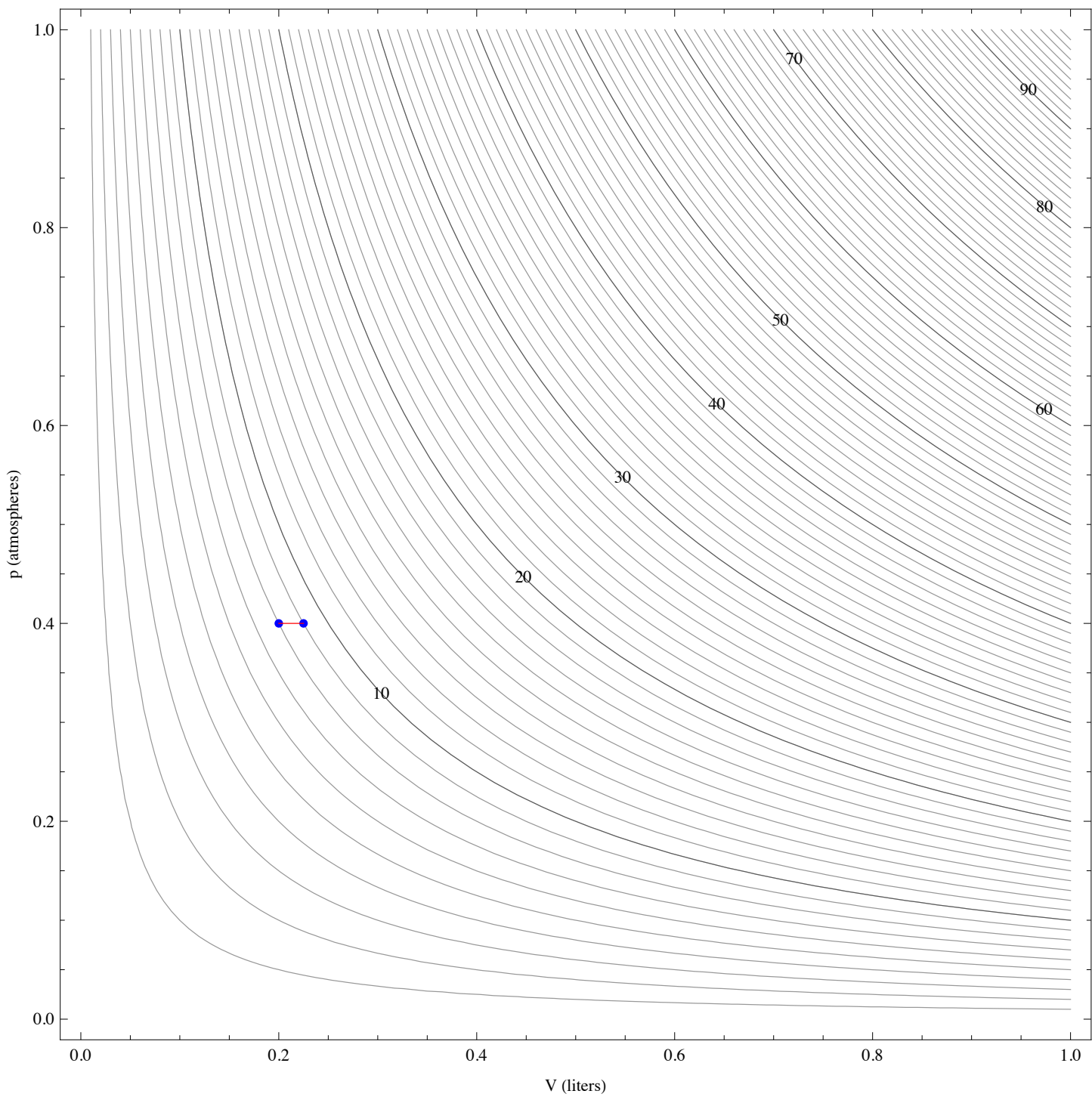
Estimate of change in T with respect to V

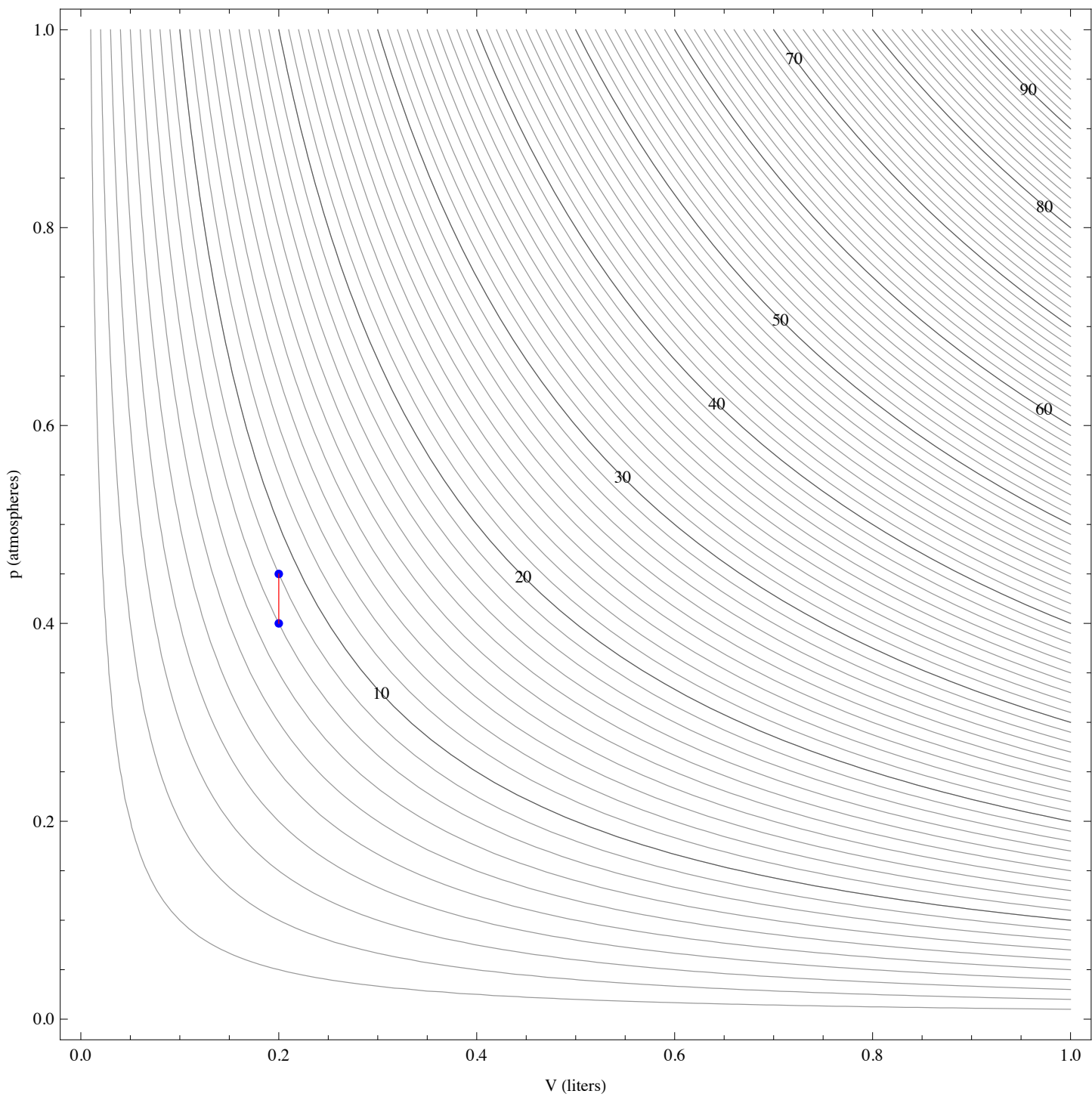Estimate of change in T with respect to p

Estimate rates of change in T for $V = 0.2$ atm and $p = 0.4$ liter

Estimate of change in T with respect to V

Estimate of change in T with respect to p