



FIGURE 28.25. Solutions to the basic diffusion equation, $d\psi/dt = \sigma^2 d^2\psi/dx^2$. (*Left column*) If the population starts concentrated at a point, it spreads out in a Gaussian distribution with variance $\sigma^2 t$. (*Middle column*) If the population starts out living only on the left side ($x > 0$), the step smooths out over time. (*Right column*) Fluctuations in density ($\sim \sin(\omega t)$) decay in amplitude, as $\exp(-\sigma^2 \omega^2 t/2)$. The rate of diffusion is set to $\sigma^2 = 1$.