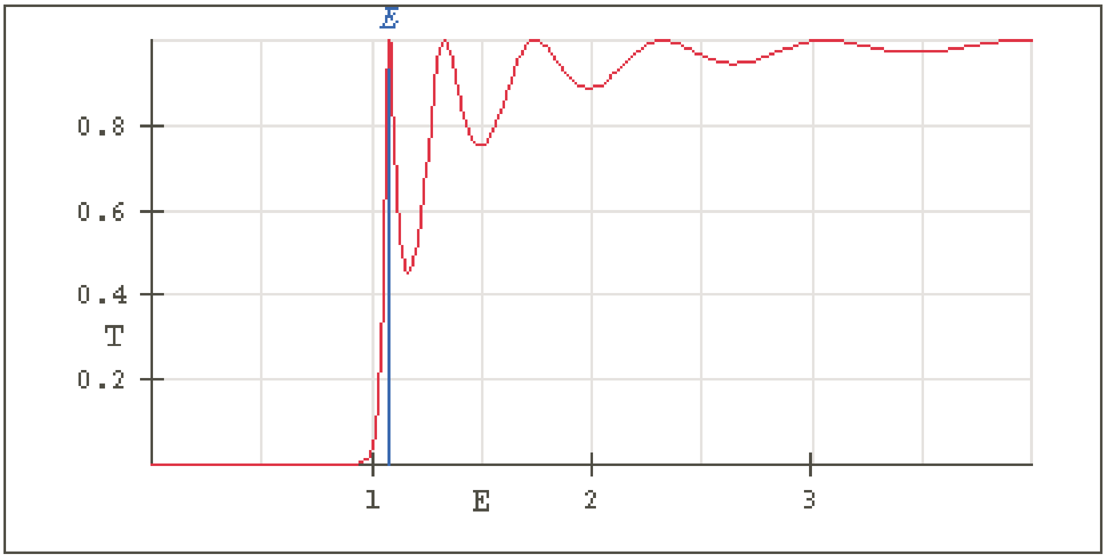
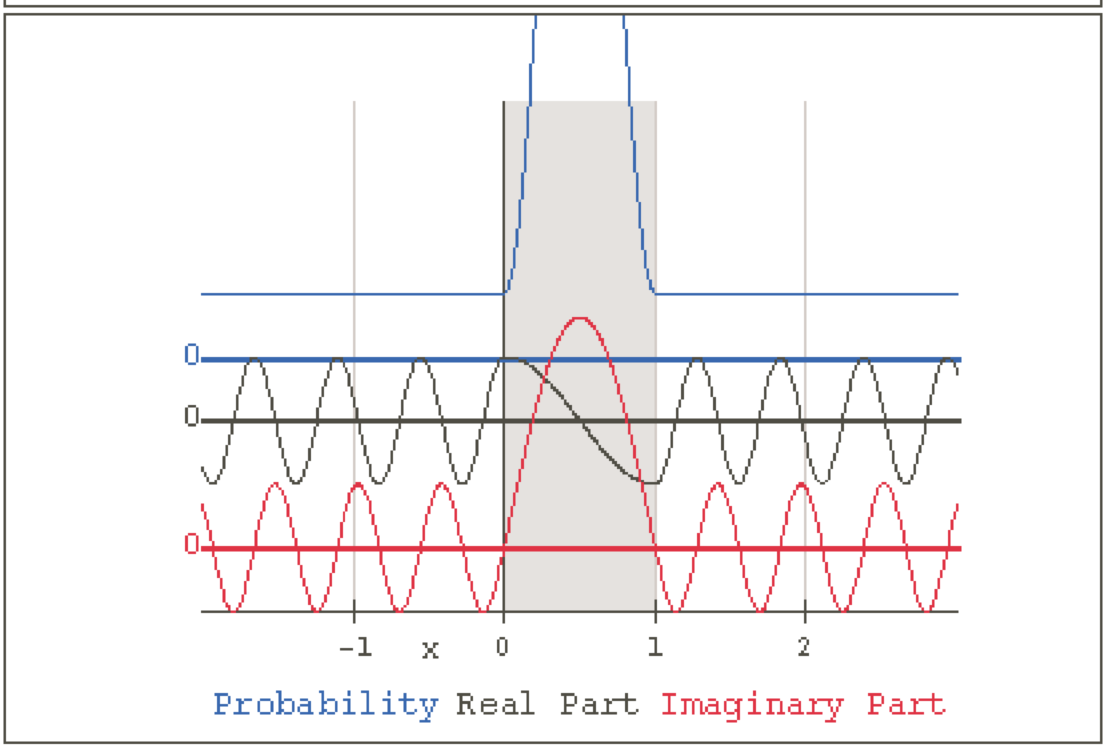
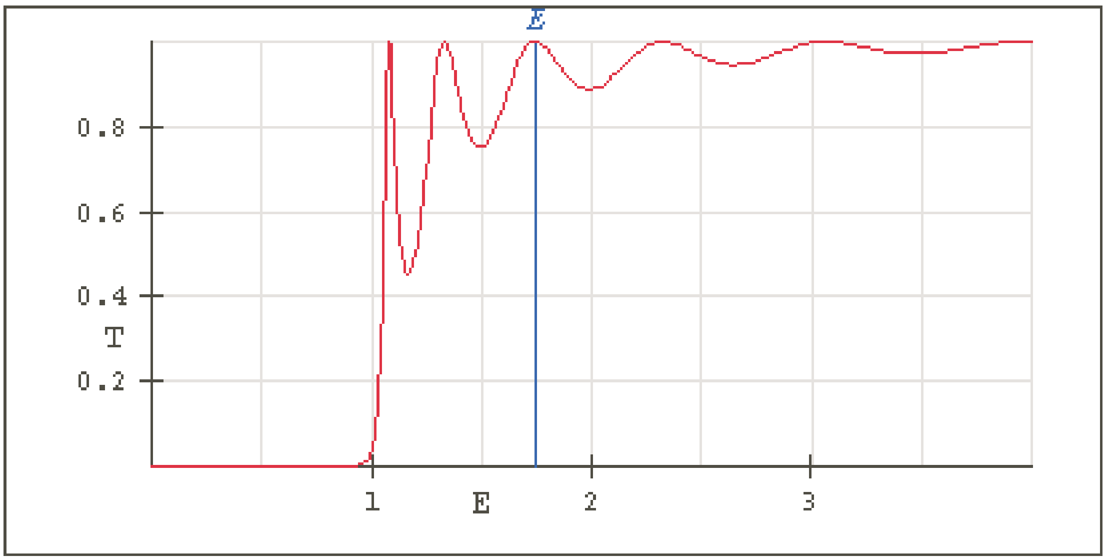
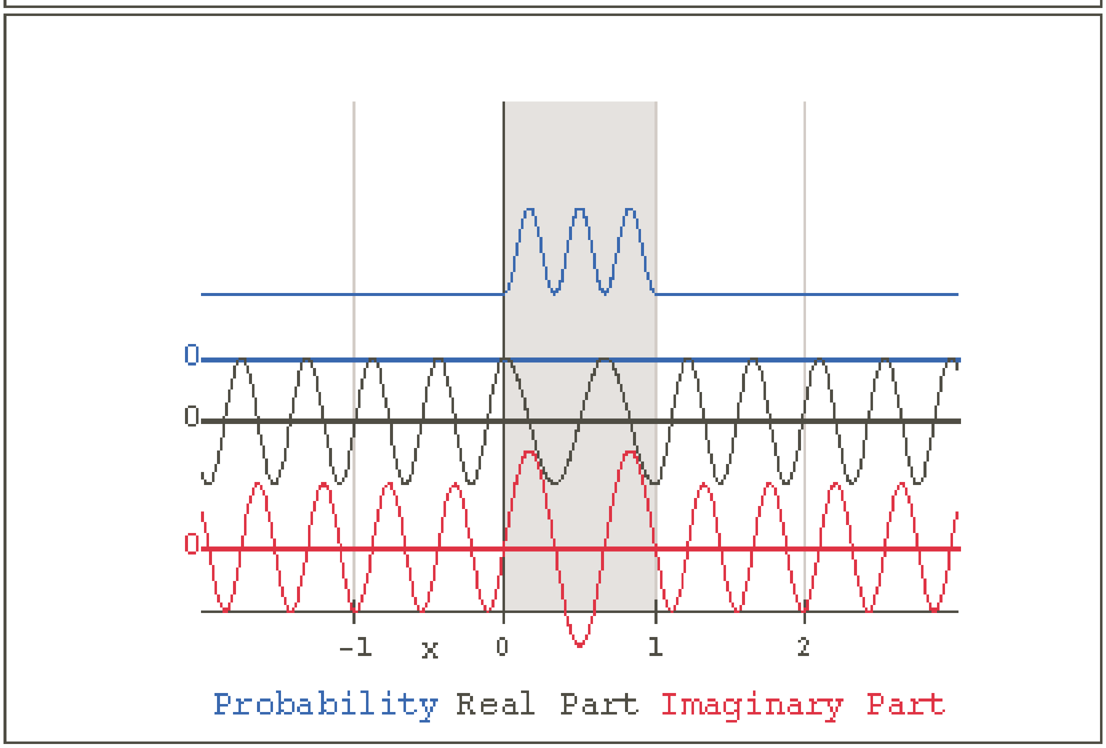
Transmission over a barrier at the first resonance. Note that the probability is constant on both sides of the barrier (no wiggles), which means there is no reflection. But note as well that the probability **over** the barrier has a huge, localized peak. We have almost *trapped* the particle in the region of the barrier. Classically, this is never seen. Note as well the shapes of the real (or imaginary) parts of the wavefunction. The wavelength is **greater** over the barrier because the kinetic energy is **lower**—part of the total energy is converted to potential energy over the barrier.





Transmission over a barrier at the third resonance. Note that the probability is still constant on both sides of the barrier. But note as well that the probability **over** the barrier now has **three** peaks. Here we have trapped the particle less well than at the first resonance, but it is still localized. The probability picks up one additional peak as we step from resonance to resonance, increasing the energy. But as the resonance peaks in the plot of T versus E broaden, the peak amplitudes fall. We approach classical behavior as E increases and the effects of the barrier become less important.





In contrast to the first resonance over a barrier, the first resonance over a **well** (the well here is as deep as the barrier before was high) does not have a single peak. The number of peaks is *one more than the number of discrete bound energy levels at $E < 0$ and in the well*. Note the wavelength decrease over the well (the particle has a greater kinetic energy over the well), and note that the particle does not have an enhanced probability over the well. Instead, the probability has valleys.