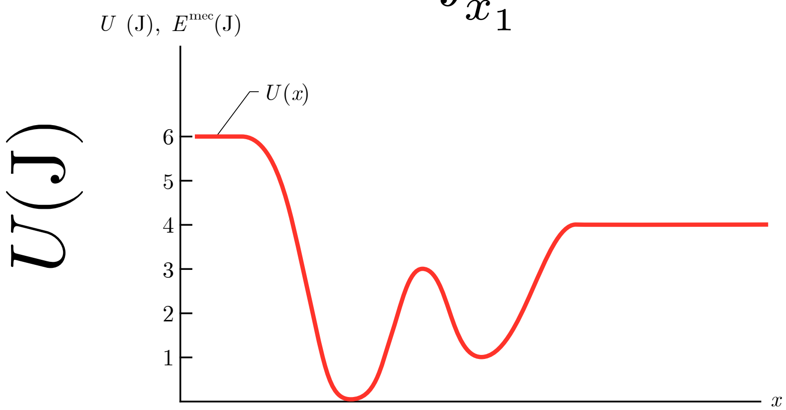
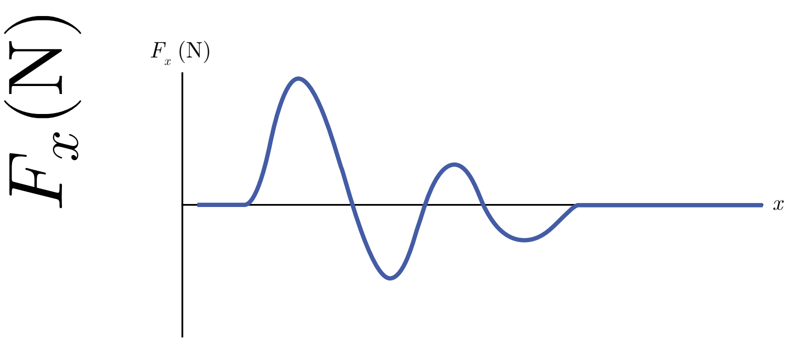
Phys 301 Class 26
Potential Functions, Particle in a Box

Potential Functions

$$\Delta U(x) = -\int_{x_1}^{x_2} F_x^{cons}(x)\,dx$$

$$F_x^{cons}(x) = -\frac{dU(x)}{dx}$$





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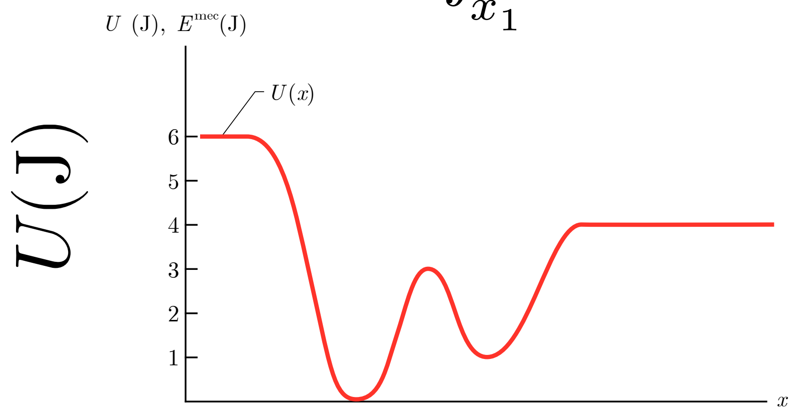
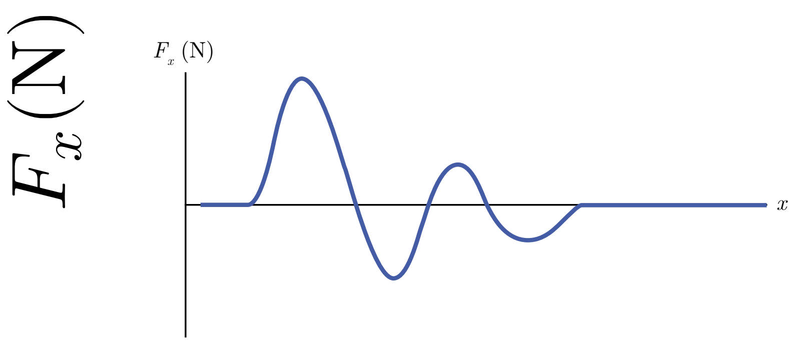


Minima or maxima of F_x:
U changes curvature.



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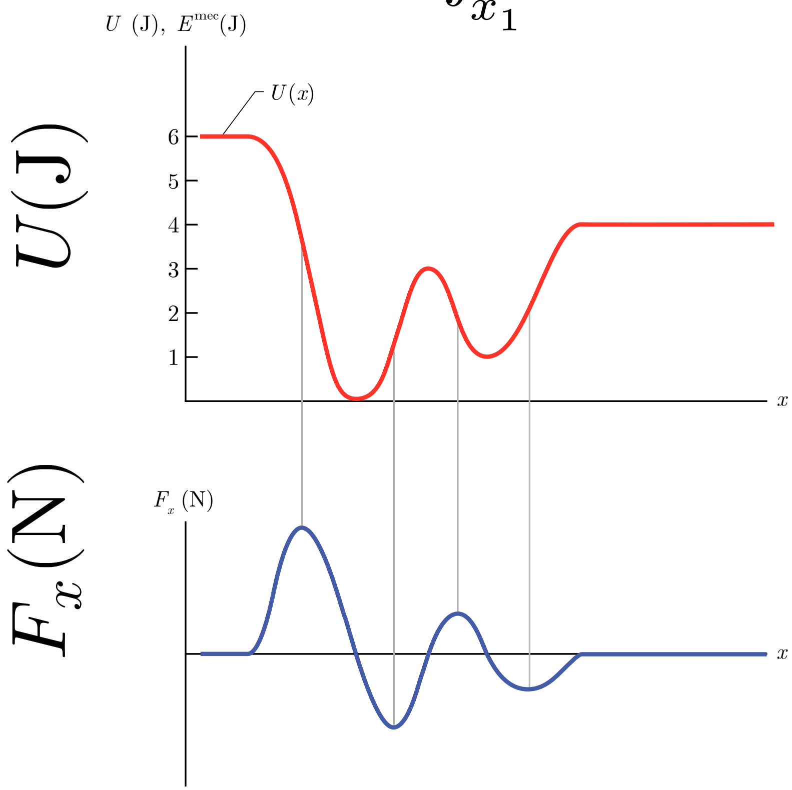

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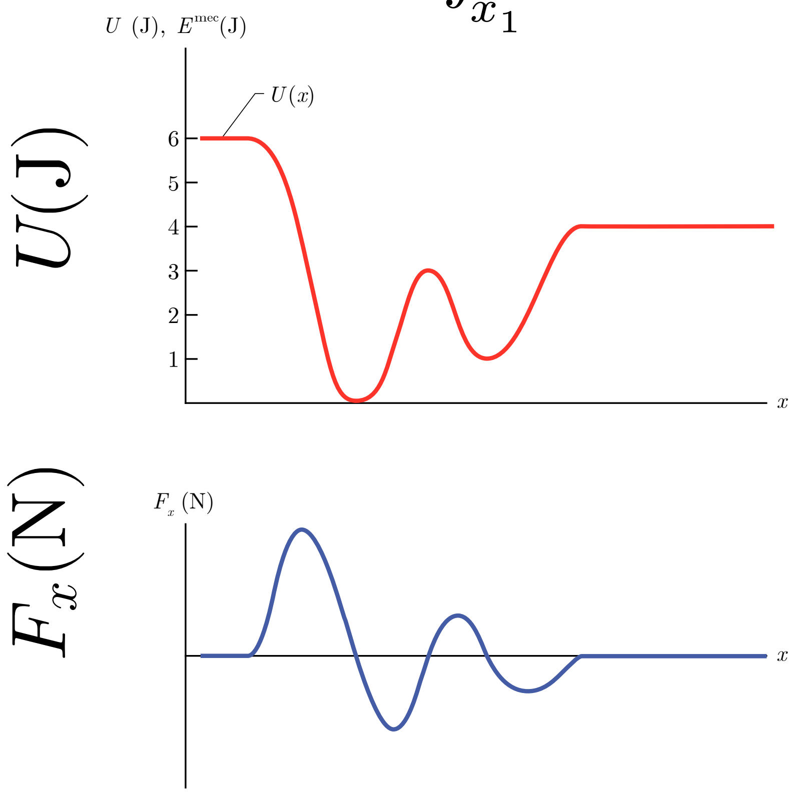

Where F_x equals zero: local minima or maxima in U.

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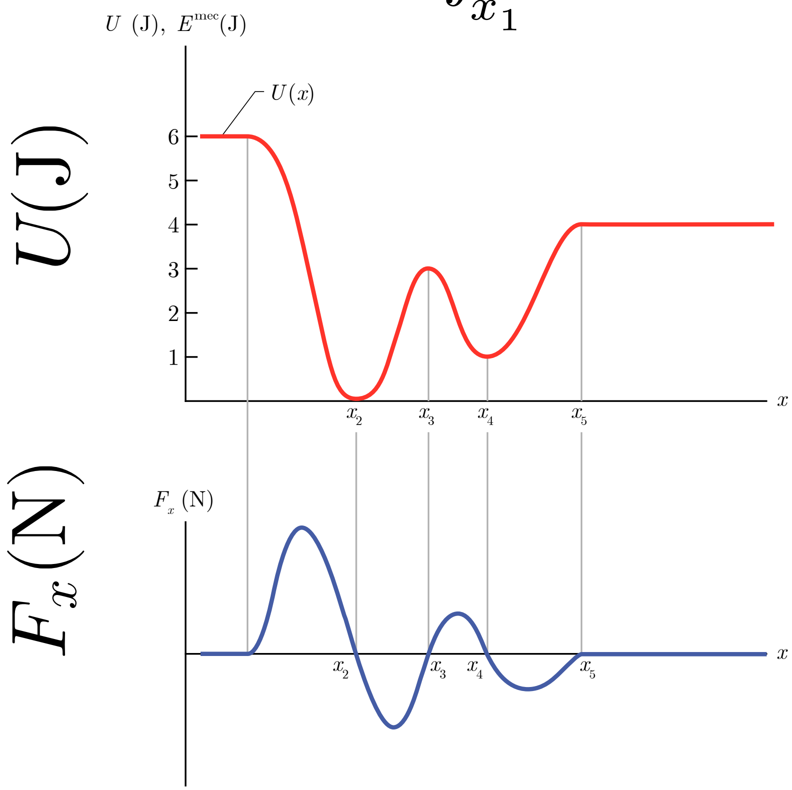

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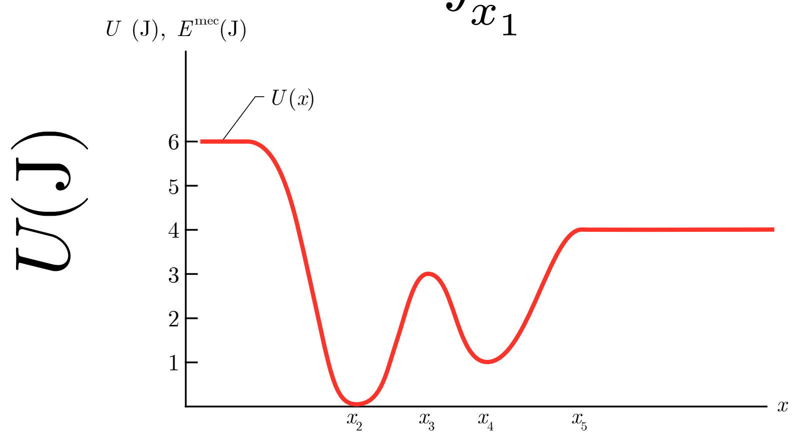
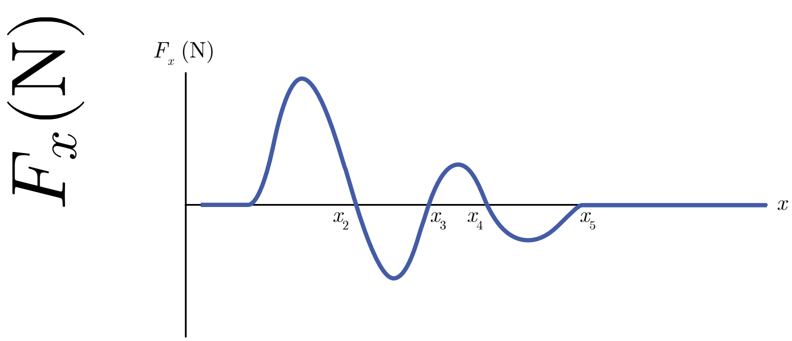


$$K = E - U$$



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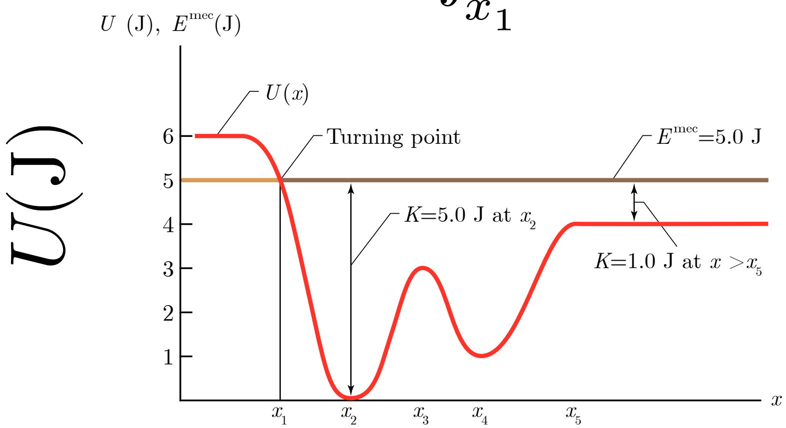

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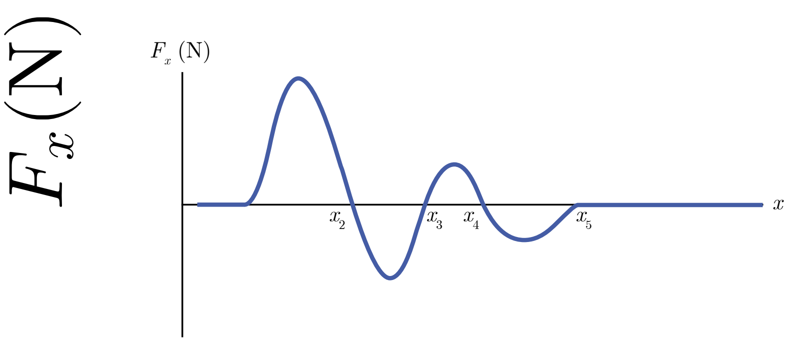

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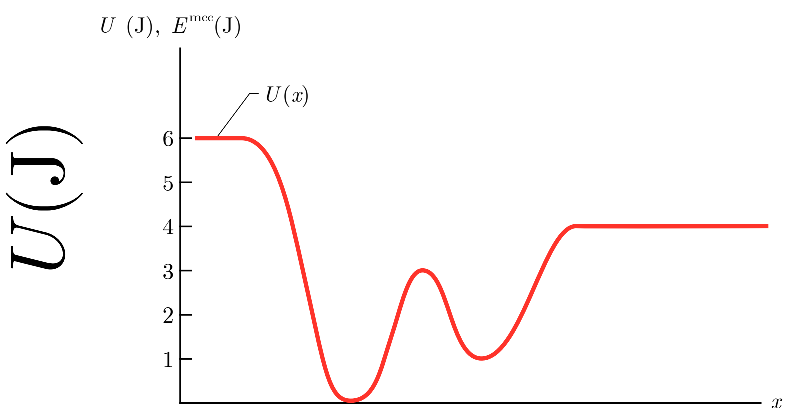

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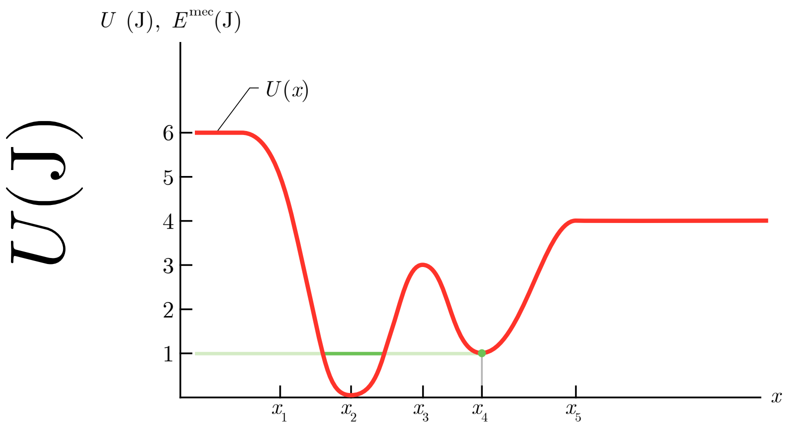

$E = 1$ J, x_4 = stable equilibrium

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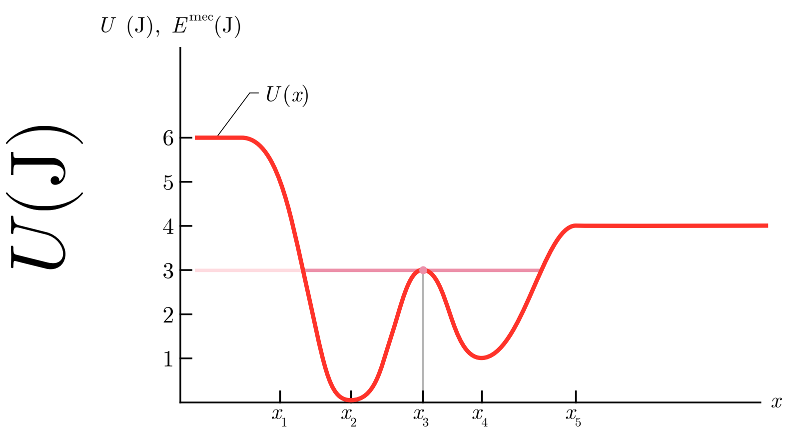
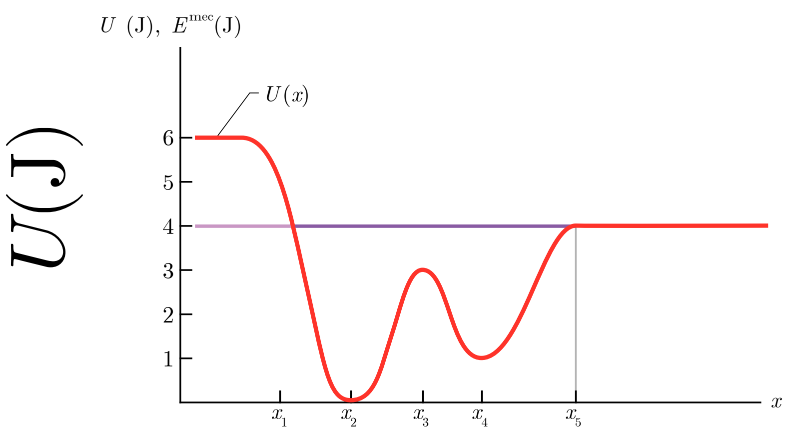


$E = 3$ J, $x_3 =$ unstable equilibrium

Potential Functions



$E = 4\ \mathrm{J}$, turning point between x_1 and x_2. Beyond x_5 = neutral equilibrium.