

# The free energy landscape for the mean field 1D ising model



- 
- What is significant about the points where the black curve intercepts with the  $x$  axis?
  - When the applied field  $H$  is equal to 0 at how many points does the black line intercept with the  $x$  axis? What happens as the the inverse temperature is increased?
  - Describe the shape of the green curve when  $H = 0$  and when (a)  $T < 0.5$  and when (b)  $T > 0.5$ . How does the shape of this curve differ in these two regimes? What happens to the derivative of the free energy with respect to  $\langle M \rangle$  at  $H = 0$  when  $T = 0.5$ ?
  - What happens to the shape of the green curve when  $H \neq 0$ . Comment on the behavior of the turning points and the way this number changes with field strength and temperature.

A network graph with blue nodes and edges, and one red node.

# MathsNET

A joined up approach to  
teaching and learning  
mathematics

- 2