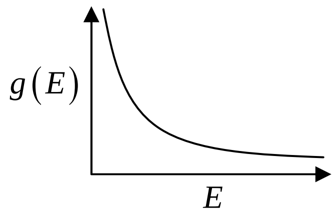
(d) Density of State in One Dimension

$$g(E)dE = \frac{1}{h}\int\int dx.dp_x \Rightarrow g(E)dE = \frac{L}{h}\int dp_x$$



where A is volume of container

$$\frac{p_x^2}{2m} = E \Rightarrow p_x = \pm\left(\sqrt{2mE}\right) \Rightarrow dp_x = \frac{1}{2}\sqrt{2m}E^{-\frac{1}{2}}dE$$

$$g(E)dE = \frac{L}{h}\int_{-\sqrt{2mE}}^{\sqrt{2mE}} dp_x \frac{L}{h}\int_{-\sqrt{2mE}}^{\sqrt{2mE}} \frac{1}{2}\sqrt{2m}E^{-\frac{1}{2}}dE$$

$$g(E)dE = \frac{2.L}{h}\frac{1}{2}\sqrt{2m}E^{-\frac{1}{2}}dE \Rightarrow g(E)dE = \frac{.L}{h}\sqrt{2m}E^{-\frac{1}{2}}dE$$

$g(E)dE$ in one dimension $g(E)dE = L\left(\frac{2m}{h^2}\right)^{\frac{1}{2}} E^{\frac{-1}{2}}dE$ where L is area of the one-dimensional space.