

$$\frac{d^{1/2}z}{dz^{1/2}} = \frac{\Gamma(1+1)}{\Gamma(1-\frac{1}{2}+1)} z^{1-1/2} = 2 \frac{z^{1/2}}{\Gamma(\frac{1}{2})} = \frac{z^{1/2}}{\sqrt{\frac{\pi}{4}}} = \frac{z^{1/2}}{\sqrt{A}}$$