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Punto 3.3.1 _ Taller 2:

$$P(v)=4\pi\left(\frac{M}{2\pi RT}\right)^{3/2}v^2 e^{-\frac{Mv^2}{2RT}}$$

$$u=\frac{Mv^2}{2RT}$$

$$v^2=\frac{2uRT}{M}$$

$$P(v)=4\cancel{\pi}\left(\frac{\cancel{M^{3/2}}}{\cancel{2^{3/2}}\,\cancel{\pi^{3/2}}\,\cancel{R^{3/2}}\,\cancel{T^{3/2}}}\right)\left(\frac{\cancel{2}u\cancel{RT}}{\cancel{M}}\right)e^{-u}$$

$$P(u)=4\frac{\sqrt{M}}{\sqrt{2}\sqrt{\pi}\sqrt{R}\sqrt{T}}u e^{-u}$$

$$\int_0^\infty P(u)\,du=\int_0^\infty 4\sqrt{\frac{M}{2\pi RT}}\,u e^{-u}\,du\rightarrow 4\sqrt{\frac{M}{2\pi RT}}\int_0^\infty u e^{-u}\,du$$

$$w=u\rightarrow dw=1\,du$$

$$\lim_{c\to\infty}\int_0^c u e^{-u}\,du\ ;\quad t=-e^{-u}\rightarrow dt=e^{-u}\,du$$

$$\int_0^c w\,dt \rightarrow wt - \int_0^0 t\,dw \rightarrow -u e^{-u} + \int_0^0 e^{-u}\,du \rightarrow -u e^{-u} - e^{-u} \Big|_0^c$$

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$$\lim_{c \to \infty} \left(-\frac{c}{e^c} - \frac{1}{e^c} \right) - \left(-\frac{0}{e^0} - \frac{1}{e^0} \right);$$

$$-\frac{c}{e^c} = \frac{\infty}{\infty} \rightarrow \text{L'Hopital}$$

$$-\frac{u}{e^u} \rightarrow -\frac{1}{e^u}$$

$$\lim_{c \to \infty} -\frac{1}{e^c} = 0$$

$$\int_0^\infty P(u)\,du = \int_0^\infty P(v)\,dv = 4\sqrt{\frac{M}{2\pi RT}}\ \ 1$$

→ En los valores que afectan la ley de gases ideales, la distribución es = 1, una de probabilidad.