من العلاقة (1):

$$p(V-b) = rT\exp\left(-\frac{a}{rTV}\right)$$

$$pV = rT\exp\left(-\frac{a}{rTV}\right) + bp$$

$$= rT\left[\exp\left(\frac{-a}{rTV}\right) + \frac{b}{rT}p\right]$$

ولدينا من (1):

$$p = \frac{rT}{V-b}\exp\left(\frac{-a}{rTV}\right)$$

وبالتالي:

$$pV = rT\left[\left(\frac{V}{V-b}\right)\exp\left(\frac{-a}{rTV}\right)\right]$$

باستخدام المفكوك لـ:

$$\exp(-x) \simeq 1 - x + \frac{x^2}{2} + \cdots$$

$$pV = rT\left[\left(1 + \frac{b}{V\left(1-\frac{b}{V}\right)}\right)\left[1 - \frac{a}{rTV} + \frac{a^2}{2r^2T^2V^2} + \cdots\right]\right]$$

$$= rT\left[1 + \frac{b}{V}\left(1 + \frac{b}{V}\right)\right]\left[1 - \frac{a}{rTV} + \frac{a^2}{2r^2T^2V^2} + \cdots\right]$$

$$= rT\left[1 + \frac{1}{V}\left(b - \frac{a}{rT}\right) + \frac{1}{V^2}\left(b^2 + \frac{a^2}{2r^2T^2} - \frac{ab}{rT}\right) + \cdots\right]$$

$$= rT\left[1 + \frac{1}{V}\left(b - \frac{a}{rT}\right) + \frac{1}{V^2}\left(b^2 + \frac{a}{rT}\left(\frac{a}{2rT} - b\right)\right) + \cdots\right]$$