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1.4.1.1 Mboyo's Board Work

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For reference, here is a list of the equations Mboyo wrote on the board in the videos.

$$E = mc^2$$

$$E = \frac{m_0 c^2}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$E = m_0 c^2$$

$$x = \frac{v}{c}$$

$$\frac{1}{\sqrt{1 - x^2}}$$

$$E = \frac{m_0 c^2}{\sqrt{1 - x^2}}$$

$$\frac{1}{\sqrt{1 - x^2}}$$

$$\frac{1}{\sqrt{1 - x^2}} = 1 + \frac{x^2}{2} + \dots$$

$$\frac{1}{\sqrt{1 - x^2}} = 1 + \frac{v^2}{2c^2} + \dots$$

$$= m_0 c^2 \left(1 + \frac{v^2}{2c^2} + \dots \right)$$



$$= m_0 c^2 \left(1 + \frac{v^2}{2c^2} + \dots \right)$$

$$= m_0 c^2 + \frac{1}{2} m_0 v^2 + \dots$$

$$E = \frac{mc^2}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$= mc^2 + \frac{1}{2} m_0 v^2$$

$$= + \frac{3}{8} m \left(\frac{v}{c} \right)^4 + \dots$$

$$E = \frac{mc^2}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$1 - \frac{v^2}{c^2} = 0 \Rightarrow v = c$$

$$1 - \frac{v^2}{c^2} > 0 \Rightarrow v^2 < c^2$$

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