HarvardX: CalcAPL1x Calculus Applied!

Help

Course > Section 10: E = mc<sup>2</sup>: Taylor Approximation and the Energy Equation (OPTIONAL) > 1.4 Higher Terms and Faster Speeds > 1.4.1.1 Mboyo's Board Work

## 1.4.1.1 Mboyo's Board Work

□Bookmark this page

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

$$E = mc^2$$

$$E=rac{m_0c^2}{\sqrt{1-rac{v^2}{c^2}}}$$

$$E=m_0c^2$$

$$x = rac{v}{c}$$

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

$$E=rac{m_0c^2}{\sqrt{1-x^2}}$$

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

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

$$rac{1}{\sqrt{1-x^2}} = 1 + rac{v^2}{2c^2} + \ldots$$

$$=m_0c^2(1+rac{x^2}{2}+\ldots)$$

$$=m_0c^2(1+rac{v^2}{2c^2}+\dots) \ =m_0c^2+rac{1}{2}m_0v^2+\dots$$

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

$$=mc^2+rac{1}{2}m_0v^2$$

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

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

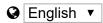
$$1 - \frac{v^2}{c^2} = 0 => v = c$$

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

Learn About Verified Certificates

© All Rights Reserved





© 2012–2017 edX Inc. All rights reserved except where noted. EdX, Open edX and the edX and Open edX logos are registered trademarks or trademarks of edX Inc. | 粤ICP备17044299号-2















