

18.1.1.1: Math Exploration 13.2

When we calculate **escape velocity**, we set the total energy equal to zero. That is equivalent to setting the curvature term in the Friedmann equation to zero:

$$\frac{kc^2}{S^2} = 0$$

The Friedmann equation then becomes:

$$H^2 - \frac{8\pi G\rho}{3} = 0$$

The only two adjustable quantities in the equation now are ρ , the average density of the Universe, and the expansion rate, H . Solving for ρ in terms of H we get:

$$\rho_{crit} = \frac{3H}{8\pi G}$$

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