Exploring Black Holes

Chapter 2

Problem 7

Take the derivative of the expression for with respect to . Use equations 12 and 19 to convert the resulting to and the resulting to .

Equation 12:

Equation 19:

Show that the result gives the following relation between and :

**Solution:**

First, let us take the derivative of with respect to .

We can isolate some terms:

And using equation 12, replace:

Leaving:

Then manipulating the original equation and solving for :

Changes the relation to:

Rearranging, we arrive at: