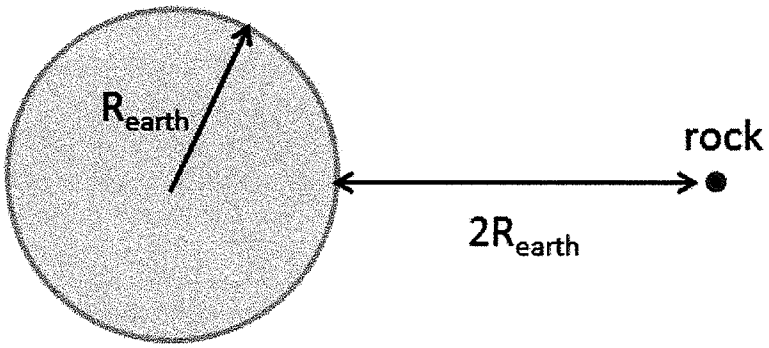
The next two questions pertain to the situation described below.

A rock on the surface of the earth weighs 72 N. The rock is now moved to a position two earth radii from the surface of the earth, as shown in the diagram.



4) What is the gravitational pull of the earth on this rock when it is at the position shown in the diagram?

$F = \frac{GMm}{(3R_e)^2}$ We know $\frac{GMm}{R_e^2} = 72\ N$

$= \frac{1}{9}\frac{GMm}{R_e^2}$

$= \frac{1}{9}72\ N = 8\ N$

a. 24 N
b. 72 N
(c) 8 N
d. 18 N
e. 36 N

5) The rock is now released from rest.

Let m be the mass of the rock and M be the mass of the earth.

Which equation below would be an appropriate application of conservation of mechanical energy, with the initial state shown above, and with the final state being just before the rock strikes the surface of the earth?

$KE + U = KE + U$

$0 - \frac{GMm}{3R_e} = \frac{1}{2}mv^2 - \frac{GMm}{R_e}$

(a.) $-GMm/3R_{earth} = \frac{1}{2}mv^2 - GMm/R_{earth}$

b. $GMm/(2R_{earth})^2 = \frac{1}{2}mv^2$

c. $-GMm/(2R_{earth})^2 = \frac{1}{2}mv^2 - GMm/(R_{earth})^2$

d. $-GMm/2R_{earth} = \frac{1}{2}mv^2 - GMm/R_{earth}$

e. $GMm/3R_{earth} = \frac{1}{2}mv^2 + GMm/R_{earth}$