The answer to the previous clicker question was [2M/(M+m)] u

If u = 0.8c and M >>m, what is this speed approximatelly?

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B) 0

C) I need to know m

D) 1.6c

E) 0.4 c

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m is so small, you can set it to zero.
The answer DOES violate relativity - we have to change our definitions of momentum and energy

A particle's relativistic momentum increases ten-fold. Assuming the rest mass stays the same, what happens to the velocity

A) increases ten-fold as well

B) increases less than ten times

C) increases more than ten times

D) the momentum can't increase ten-fold because then the particle would be moving faster than light

E) the rest mass has to increase if the momentum increases

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Momentum can increase without bound, but velocity cannot

We have a very light box with 1 mol of He gas, each atom weighing 4au. (Reminder: $(N_A)(1au) = 1g$, so the total rest mass of these atoms is 4g). Let's heat up the gas until the average speed of an atom in the box is 0.6c. What is the mass of the box of hot gas?

A) 4g since mass is additive

B) 4g since the heat energy went into kinetic energy

C) 5g

D) 6.7 g

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With v = 0.6c, γ=1.25. Each atom has (4au)γ = 5au of energy, all of which looks like mass when viewed from the outside (the movement of the atoms is internal motion).

D) 6.7 g

E) depends on whether you mean gravitational mass or inertial mass

Which of the following statements is true?

A) Energy can be created and destroyed, but mass is conserved.

B) Neither mass nor energy is conserved

C) Mass and energy are each conserved separately.

D) The sum of mass and energy is conserved, but they can be turned into each other as long as the sum is conserved.

E) Mass can be created and destroyed but energy is always conserved.

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Mass is a derived concept, not fundamental, it can be made and unmade. Energy is ALWAYS conserved (fundamental law).