

MATH 1030-006
Quiz 4

Name: _____ ID: U _____

1. (10 points) The final cost of your new shoes is \$107.69. The local sales tax rate is 6.2%. What was the retail (pre-tax) price?

$$(100+6.2)\% \text{ of Pre-tax Price} = \$107.69$$

$$106.2\% \times \text{Pre-tax Price} = \$107.69$$

$$\text{Pre-tax Price} = \frac{\$107.69}{106.2\%} = \frac{\$107.69}{1.062} = \$101.40$$

2. (10 points) If you could generate energy by fusing the hydrogen in ordinary tap water, how much water would you need to supply all the energy currently consumed worldwide?

[Energy released by fusion of hydrogen in 1 liter of water is 7×10^{13} Joules, World annual energy consumption is 10^{20} Joules.]

$$\begin{aligned} \text{Amount of water of needed} &= \frac{10^{20} \text{ Joules}}{7 \times 10^{13} \text{ Joules/liter}} \\ &= 10^{20} \text{ Joules} \times \frac{\text{liter}}{7 \times 10^{13} \text{ Joules}} \\ &= \frac{1}{7} \times 10^7 \text{ liter} \\ &= 0.1429 \times 10^7 \text{ liter} \\ &= 1.43 \text{ million liter} \end{aligned}$$