In-class problem linked to lecture pages 98-107

What would be the value of Boltzmann's constant if the temperature of the triple point were defined as $T_{\text{triple point}} = 100K$? What would be the boiling point of water on this scale?

Phys 301

In-class for lecture pages 98-107

$T = 273.16\ K$

$k = 1.381 \times 10^{-23}\ J/K$

$kT = 3.77 \times 10^{-21}$

If $T = 100\ K$

Then $k = \frac{3.77 \times 10^{-21}}{100} = 3.77 \times 10^{-23}$

On old scale there are 273.16 degree from 0 to tp.

On new scale there are 100 degree from 0 to tp

New degree are larger than old degree by factor

$\frac{273.16}{100} = 2.7316$

to get to boiling, need 100 old degrees, or

$\frac{100}{2.7316} = 36.6$ new degrees

So boiling pt. = $100 + 36.6 = 136.6\ K$