

9. We assume scale X is a linear scale in the sense that if its reading is x then it is related to a reading y on the Kelvin scale by a linear relationship $y = mx + b$. We determine the constants m and b by solving the simultaneous equations:

$$\begin{aligned} 373.15 &= m(-53.5) + b \\ 273.15 &= m(-170) + b \end{aligned}$$

which yield the solutions $m = 100/(170 - 53.5) = 0.858$ and $b = 419$. With these values, we find x for $y = 340$:

$$x = \frac{y - b}{m} = \frac{340 - 419}{0.858} = -92.1^\circ X .$$