EQUATIONS FOR CALCULATING WIND CHILL FACTORS, ETC.

Wind Chill: $W_C = 0.045 * (5.27 * \sqrt{W_S} + 10.45 - 0.28 * W_S) * (T - 33) + 33$

Temperature: $T = 33 + ((W_C - 33)/(0.045 * (5.27 * \sqrt{W_S} + 10.45 - 0.28 * W_S)))$

Wind Speed: $W_S = \left[\frac{-5.27 + \sqrt{27.7729 - 1.12K}}{-0.56} \right]^2$

Constant for Wind Speed: $K = \left[\frac{(W_C - 33)}{0.045 * (T - 33)} \right] - 10.45$

WHERE,

W_C Wind Chill Factor

W_S Wind Speed

T Temperature

K Constant, used in Wind Speed calculation

NOTE:

Rearranging the equation for Wind Chill (W_C) to calculate Wind Speed (W_S), we get an equation in the form of a quadratic (ie. $ax^2 + bx + c = 0$). However, our specific form of the quadratic, in the current situation, reduces to the form $ax + b\sqrt{x} + c = 0$, and as such rather than solving for x we are actually solving for $\sqrt{x}$. Therefore we have to square our result to obtain the final value for the Wind Speed – that is, $x = (\sqrt{x})^2$. The resulting equation reduces, therefore, to the form:

$$x = (\sqrt{x})^2 = \left(\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}\right)^2$$