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Temperature Quiz: Solutions

A. Convert the following temperatures to the Kelvin scale.

$$17\text{ }^{\circ}\text{C} \quad T_K = T_C + 273.15 \quad T_K = 17 + 273.15 = 290.15\text{ K}$$

$$-40\text{ }^{\circ}\text{C} \quad T_K = T_C + 273.15 \quad T_K = -40 + 273.15 = 233.15\text{ K}$$

$$95\text{ }^{\circ}\text{F} \quad T_C = (5/9)(T_F - 32) \quad T_C = (5/9)(95 - 32) = 35\text{ }^{\circ}\text{C}$$
$$T_K = T_C + 273.15 \quad T_K = 35 + 273.15 = 308.15\text{ K}$$

B. Convert the following temperatures to the Celsius scale.

$$298.15\text{ K} \quad T_C = T_K - 273.15 \quad T_C = 298.15 - 273.15 = 25\text{ }^{\circ}\text{C}$$

$$32\text{ }^{\circ}\text{F} \quad T_C = (5/9)(T_F - 32) \quad T_C = (5/9)(32 - 32) = 0\text{ }^{\circ}\text{C}$$

$$451\text{ }^{\circ}\text{F} \quad T_C = (5/9)(T_F - 32) \quad T_C = (5/9)(451 - 32) = 232.78\text{ }^{\circ}\text{C}$$

C. Convert the following temperatures to the Fahrenheit scale.

$$298.15\text{ K} \quad T_C = T_K - 273.15 \quad T_C = 298.15 - 273.15 = 25\text{ }^{\circ}\text{C}$$
$$T_F = (9/5)T_C + 32 \quad T_F = (9/5)(25) + 32 = 77\text{ }^{\circ}\text{F}$$

$$373.15\text{ K} \quad T_C = T_K - 273.15 \quad T_C = 373.15 - 273.15 = 100\text{ }^{\circ}\text{C}$$
$$T_F = (9/5)T_C + 32 \quad T_F = (9/5)(100) + 32 = 212\text{ }^{\circ}\text{F}$$

$$-40\text{ }^{\circ}\text{C} \quad T_F = (9/5)T_C + 32 \quad T_F = (9/5)(-40) + 32 = -40\text{ }^{\circ}\text{F}$$