

Table 9.5 Floating-Point Numbers and Arithmetic Operations

Floating Point Numbers	Arithmetic Operations
$X = X_s \times B^{X_E}$ $Y = Y_s \times B^{Y_E}$	$\left. \begin{aligned} X + Y &= \left(X_s \times B^{X_E - Y_E} + Y_s \right) \times B^{Y_E} \\ X - Y &= \left(X_s \times B^{X_E - Y_E} - Y_s \right) \times B^{Y_E} \end{aligned} \right\} X_E \leq Y_E$ $X \times Y = (X_s \times Y_s) \times B^{X_E + Y_E}$ $\frac{X}{Y} = \left(\frac{X_s}{Y_s} \right) \times B^{X_E - Y_E}$

Examples:

$$X = 0.3 \times 10^2 = 30$$

$$Y = 0.2 \times 10^3 = 200$$

$$X + Y = (0.3 \times 10^{2-3} + 0.2) \times 10^3 = 0.23 \times 10^3 = 230$$

$$X - Y = (0.3 \times 10^{2-3} - 0.2) \times 10^3 = (-0.17) \times 10^3 = -170$$

$$X \times Y = (0.3 \times 0.2) \times 10^{2+3} = 0.06 \times 10^5 = 6000$$

$$X \div Y = (0.3 \div 0.2) \times 10^{2-3} = 1.5 \times 10^{-1} = 0.15$$