(3)

(a) [0] [0000 1101] [11001011 0000 0000 0000 0000]

Sign : $(-1)^0 =$ ● $\underline{\underline{+1}}$

Exponent : $2^3 + 2^2 + 2^0 = 8 + 4 + 1 = \underline{13}$ ⟸ [0000 1101]
$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ base-2

Mantissa = [11001011] = $1 + 2^{-1} + 2^{-2} + 2^{-5} + 2^{-7} + 2^{-8}$

$\qquad\qquad\qquad\qquad\qquad = $ ● $\underline{1.79296875}$

⟹ $(+1)(2^{13-127})(1.79296875)$

$\qquad\quad = (8.632830512 \times 10^{-35})$
$\qquad\qquad\qquad\qquad\qquad\qquad$ base-10

(b) [0] [1000 0101] [11001011 0000 0000 0000 000]

Sign : [0] ⟹ $(-1)^0 = +1$

Exponent : [1000 0101] ⟹ $2^7 + 2^2 + 2^0 = 128 + 4 + 1$
$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad = 133$

Mantissa: [11001011] ⟹ $1 + 2^{-1} + 2^{-2} + 2^{-5} + 2^{-7} + 2^{-8}$

$\qquad\qquad\qquad\qquad = $ ● 1.79296875

⟹ $(+1)(2^{133-127})(1.79296875)$

$\qquad\quad = (114.75)_{\text{base-10}}$