6. General formula: $\text{sign} \cdot (1 + \text{mantissa}) \times 2^{(\text{exponent} - 127)}$

a) Convert to Big Endian:

00111111,00011001,10011001,10011010 - LE

10011010,10011001,00011001,00111111 - BE

- sign: 1 - negative
- exponent: $2^0 + 2^2 + 2^4 + 2^5 - 127 = -74$
- mantissa: $1 + 2^{-3} + 2^{-4} + 2^{-7} + 2^{-11} + 2^{-12} + 2^{-15} + 2^{-18} + 2^{-19} + 2^{-20} + 2^{-21} + 2^{-22} + 2^{-23} \approx$

$\approx 1,19608$

$x = -1,19608 \cdot 2^{-74} \approx -6,9315 \cdot 10^{-23}$

b) Convert to Big Endian

01000010,11110111,00111001,10010011 - LE

10010011,00111001,11110111,01000010 - BE

- sign: 1 ⊢ negative
- exponent: $2^1 + 2^2 + 2^5 - 127 = -89$
- mantissa: $1 + 2^{-2} + 2^{-3} + 2^{-4} + 2^{-7} + 2^{-8} + 2^{-9} + 2^{-10} + 2^{-11} + 2^{-13} + 2^{-14} + 2^{-15} + 2^{-18} + 2^{-22} =$

$\approx 1,45286$

$x = -1,45286 \cdot 2^{-89} \approx -2,34722 \cdot 10^{-27}$

c) Convert to Big Endian

11000011,10111110,10011100,11001010 - LE

11001010,10011100,10111110,11000011 - BE

- sign: 1 - negative
- exponent: $2^7 + 2^0 + 2^2 + 2^4 - 127 = -106 + 2^7 = 22$
- mantissa: $1 + 2^{-3} + 2^{-4} + 2^{-5} + 2^{-9} + 2^{-11} + 2^{-12} + 2^{-13} + 2^{-14} + 2^{-16} + 2^{-17} + 2^{-22} + 2^{-23} =$

$\approx 1,22164$

$x = -1,22164 \cdot 2^{22} \approx -5,12410 \cdot 10^6$

7. d) Yes, if X is NaN, because IEEE 754 says that NaN is not equal to any value, including itself.

e) No. if x is any infinity, then Y is NaN.

if x is NaN, then Y is also NaN.

f) Yes. if Y will be too small relative to X (Y is smaller that epsilon of X) due to the limited floating-point precision ⇒ X + Y == X

g) No. Addition is not associative for floating-point precision.