

3.2 5730

3.4 753

3.6 Neither (63)

3.7 Neither (65)

185 $\rightarrow$ 1011 1001 = (-57) in signed magnitude

122 $\rightarrow$ 0111 1010 is a positive number in signed magnitude

1011 1001 + 0111 1010 = -0011 1001+0111 1010= 0100 0001

3.8 Overflow, result = -179, which does not fit into an SM 8-bit format

3.11 151+214=255 (365)

3.20 201326592 in both cases

3.22 answer= 1.0×2^{-103}

0x0C00 0000= 0000 1100 0000 0000 0000 0000 0000 0000

=0 00011000 000 0000 0000 0000 0000 0000

S=0

Exponent=0001 1000, exp=24-137=-103

Fraction = 000 0000 0000 0000 0000 0000

3.23 $63.25 \times 10^0 = 111111.01 \times 2^0$

normalize, move binary point 5 to the left

$$1.1111101 \times 2^5$$

$$\text{sign} = \text{positive}, \text{exp} = 127 + 5 = 132$$

Final bit pattern: 0 1000 0100 1111 1010 0000 0000 0000 000

$$= 0100\ 0010\ 0111\ 1101\ 0000\ 0000\ 0000\ 0000 = 0x427D0000$$

3.24 $63.25 \times 10^0 = 111111.01 \times 2^0$

normalize, move binary point 5 to the left

$$1.1111101 \times 2^5$$

$$\text{sign} = \text{positive}, \text{exp} = 1023 + 5 = 1028$$

Final bit pattern:

0 100 0000 0100 1111 1010 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000

$$= 0x404FA00000000000$$

3.27 $-1.5625 \times 10^{-1} = -.15625 \times 10^0$

$$= -.00101 \times 2^0$$

move the binary point 3 to the right, $= -1.01 \times 2^{-3}$

exponent $= -3 = -3 + 15 = 12$, fraction $= -.0100000000$

answer: 1011000100000000

3.29 $2.6125 \times 10^1 + 4.150390625 \times 10^{-1}$

$$2.6125 \times 10^1 = 26.125 = 11010.001 = 1.1010001000 \times 2^4$$

$$4.150390625 \times 10^{-1} = .4150390625 = .011010100111 = 1.1010100111 \times 2^{-2}$$

Shift binary point 6 to the left to align exponents,

GR

1.1010001000 00

~~0~~1.0000011010 10 0111 (Guard 5 1, Round 5 0,
Sticky 5 1)

1.1010100010 10

In this case the extra bit (G,R,S) is more than half of the least significant bit (0).

Thus, the value is rounded up.

$$1.1010100011 \times 2^4 = 11010.100011 \times 2^0 = 26.546875 = 2.6546875 \times 10^1$$

3.41

Answer	sign	exp	Exact?
1 0111101 000000000000000000000000	–	–2	Yes