

HW3 solution

3.10

$$\mathbf{3.10} \quad -105 + 42 = -63$$

3.11

$$\mathbf{3.11} \quad 151 + 214 = 255 \text{ (365)}$$

3.13

$$\mathbf{3.13} \quad 62 \times 12$$

Step	Action	Multiplicand	Product/Multiplier
0	Initial Vals	110 010	000 000 001 010
1	lsb=0, no op	110 010	000 000 001 010
	Rshift Product	110 010	000 000 000 101
2	Prod=Prod+Mcand	110 010	110 010 000 101
	Rshift Mplier	110 010	011 001 000 010
3	lsb=0, no op	110 010	011 001 000 010
	Rshift Mplier	110 010	001 100 100 001
4	Prod=Prod+Mcand	110 010	111 110 100 001
	Rshift Mplier	110 010	011 111 010 000
5	lsb=0, no op	110 010	011 111 010 000
	Rshift Mplier	110 010	001 111 101 000
6	lsb=0, no op	110 010	001 111 101 000
	Rshift Mplier	110 010	000 111 110 100

3.22

3.22

$$0 \times 0C000000 = 0000 \ 1100 \ 0000 \ 0000 \ 0000 \ 0000 \ 0000$$

$$= 0 \ 0001 \ 1000 \ 0000 \ 0000 \ 0000 \ 0000 \ 000$$

sign is positive

$$\text{exp} = 0 \times 18 = 24 - 127 = -103$$

there is a hidden 1

mantissa = 0

$$\text{answer} = 1.0 \times 2^{-103}$$

3.23

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

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

3.27

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

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

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

$$\text{exponent} = -3 = -3 + 15 = 12, \text{fraction} = -.0100000000$$

answer: 1011000100000000