

Chapter 28

3. a) 26.78175

$$\begin{array}{r} 2 \overline{) 11} \\ 2 \overline{) 31} \\ 2 \overline{) 60} \\ 2 \overline{) 131} \\ 2 \overline{) 360} \end{array}$$

$$\begin{array}{r} .78125 \\ \hline .5625 \\ \hline .125 \\ \hline .25 \\ \hline .5 \\ \hline .0 \end{array}$$

* Each divider represents $\times 2$ - trying to save space *

11010, 11001

b) 194.03125

$$\begin{array}{r} 31 \\ 2 \overline{) 62} \\ \underline{62} \\ 00 \\ 2 \overline{) 12} \\ \underline{12} \\ 00 \\ 2 \overline{) 24} \\ \underline{24} \\ 00 \\ 2 \overline{) 48} \\ \underline{48} \\ 00 \\ 2 \overline{) 97} \\ \underline{96} \\ 01 \\ 2 \overline{) 194} \\ \underline{194} \\ 00 \end{array}$$

$\frac{0}{1} \cdot 03125$
 $\frac{0}{1} \cdot 0625$
 $\frac{0}{1} \cdot 125$
 $\frac{0}{1} \cdot 25$
 $\frac{0}{1} \cdot 5$
 $\frac{1}{1} \cdot 0$

11000010.0000

4. a) 25.84375

$$\begin{array}{r} 2 \overline{) 11} \\ 2 \overline{) 31} \\ 2 \overline{) 60} \\ 2 \overline{) 120} \\ 2 \overline{) 251} \end{array}$$

1. 84375
 1. 63875
 1. 395
 0. 75
 1. 5
 1. 0

11001. 11011

4. b) 57.55

$$\begin{array}{r}
 2 \overline{) 11} \quad 1 \\
 2 \overline{) 3} \quad 1 \\
 2 \overline{) 7} \quad 1 \\
 2 \overline{) 14} \quad 0 \\
 2 \overline{) 28} \quad 0 \\
 2 \overline{) 57} \quad 1
 \end{array}$$

111001.100011

$$\begin{array}{r}
 .55 \\
 1 \overline{) .1} \\
 0 \overline{) .2} \\
 0 \overline{) .4} \\
 0 \overline{) .8} \\
 1 \overline{) .6} \\
 1 \overline{) .2}
 \end{array}$$

5. a) 77

8-bit signed

$$\begin{array}{r}
 2 \overline{) 77} \quad 1 \\
 2 \overline{) 38} \quad 0 \\
 2 \overline{) 19} \quad 1 \\
 2 \overline{) 9} \quad 1 \\
 2 \overline{) 4} \quad 0 \\
 2 \overline{) 2} \quad 0 \\
 2 \overline{) 1} \quad 1
 \end{array}$$

01001101

One's Complement

01001101

Two's Complement

01001101

b) -42

$$\begin{array}{r}
 2 \overline{) 42} \quad 0 \\
 2 \overline{) 21} \quad 1 \\
 2 \overline{) 10} \quad 0 \\
 2 \overline{) 5} \quad 1 \\
 2 \overline{) 2} \quad 0 \\
 2 \overline{) 1} \quad 1
 \end{array}$$

10101010

00101010

11010101

11010101

11010110

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5.c) 119

8-bit signed

One's Complement

Two's Complement

2 | 119 | 1
2 | 59 | 1
2 | 29 | 1
2 | 14 | 0
2 | 7 | 1
2 | 3 | 1
2 | 1 | 1

01110111

01110111

01110111

d) -107

2 | 107 | 1
2 | 53 | 1
2 | 26 | 0
2 | 13 | 1
2 | 6 | 0
2 | 3 | 1
2 | 1 | 1

11101011

01101011
10010100

10010100
10010101

1) 76-31

2 | 76 | 0
2 | 38 | 0
2 | 19 | 1
2 | 9 | 1
2 | 4 | 0
2 | 2 | 0
2 | 1 | 1

01001100

2 | 31 | 1
2 | 15 | 1
2 | 7 | 1
2 | 3 | 1
2 | 1 | 1

00011111

11100000

11100001

01001100

+ 11100001

00101101

#2) 21 - 34

$$\begin{array}{r} 2 \overline{) 21} \quad 1 \\ 2 \overline{) 10} \quad 0 \\ 2 \overline{) 5} \quad 1 \\ 2 \overline{) 2} \quad 0 \\ 2 \overline{) 1} \quad 1 \end{array}$$

00010101

$$\begin{array}{r} 2 \overline{) 34} \quad 0 \\ 2 \overline{) 17} \quad 1 \\ 2 \overline{) 8} \quad 0 \\ 2 \overline{) 4} \quad 0 \\ 2 \overline{) 2} \quad 0 \\ 2 \overline{) 1} \quad 1 \end{array}$$

00100010 \rightarrow 11011101

11011110

$$\begin{array}{r} \text{Two's} \\ 00010101 \\ + 11011110 \\ \hline \end{array}$$

11110011 \rightarrow 10001101 = -13

#3) -7 + 24

$$\begin{array}{r} 2 \overline{) 24} \quad 0 \\ 2 \overline{) 12} \quad 0 \\ 2 \overline{) 6} \quad 0 \\ 2 \overline{) 3} \quad 1 \\ 2 \overline{) 1} \quad 1 \end{array}$$

00011000

$$\begin{array}{r} 2 \overline{) 7} \quad 1 \\ 2 \overline{) 3} \quad 1 \\ 2 \overline{) 1} \quad 1 \end{array}$$

00000111 \rightarrow 11111000

1111001

1111
00011000

+ 11111001

00010001

Ch. 3A #1.c)

	yz	00	01	11	10
x	0	1	1	1	0
	1	1	1	1	1

$$X + Y + Z$$

Ch. 3A #3 a)

	yz	00	01	11	10
wx	00	1			1
	01	1			1
	11			1	
	10			1	

$$wyz + \overline{w} \cdot \overline{z} + \overline{x} \cdot \overline{y} \cdot \overline{z}$$

$$wyz + \overline{z} (w + \overline{x} \cdot \overline{y})$$

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Ch. 3A #4a) $\overline{w}x\overline{y}z + \overline{w}x\overline{y}z + \overline{w}x\overline{y}z + \overline{w}x\overline{y}z + w\overline{x}\overline{y}z + w\overline{x}\overline{y}z$

$wx \backslash yz$	00	01	11	10
00	1			1
01		1	1	1
11				
10	1			1

$$\overline{x} \cdot \overline{z} + \overline{w} \cdot x \cdot \overline{z} + \overline{w} \cdot x \cdot y$$

$$\overline{x} \cdot \overline{z} + \overline{w} (x \cdot \overline{z} + x \cdot y)$$

#4c) $\overline{y} \cdot z + w \cdot \overline{y} + \overline{w} \cdot x \cdot y + \overline{w} \cdot \overline{x} \cdot y \cdot \overline{z} + w\overline{x}\overline{y}z$

$wx \backslash yz$	00	01	11	10
00		1		1
01		1	1	1
11	1	1		
10	1	1		1

$$\overline{y} \cdot z + w \cdot \overline{y} + \overline{w} \cdot x \cdot y + \overline{w} \cdot \overline{x} \cdot y \cdot \overline{z}$$