CHAPTER 1

1.1   Base-10: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Octal: 20 21 22 23 24 25 26 27 30 31 32 33 34 35 36 37 40
Hex: 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F 20
Base-13   A B C 10 11 12 13 14 15 16 17 18 19 23 24 25 26

1.2   **(a)** 32,768   **(b)** 67,108,864   **(c)** 6,871,947,674

1.3 $(4310)_5 = 4 * 5^3 + 3 * 5^2 + 1 * 5^1 = 580_{10}$

$(198)_{12} = 1 * 12^2 + 9 * 12^1 + 8 * 12^0 = 260_{10}$

$(735)_8 = 7 * 8^2 + 3 * 8^1 + 5 * 8^0 = 477_{10}$

$(525)_6 = 5 * 6^2 + 2 * 6^1 + 5 * 6^0 = 197_{10}$

1.4   14-bit binary: 11_1111_1111_1111
Decimal: $2^{14} -1 = 16,383_{10}$
Hexadecimal: $3FFF_{16}$

1.5   Let b = base

(a) 14/2 = (b + 4)/2 = 5, so b = 6

(b) 54/4 = (5*b + 4)/4 = b + 3, so 5 * b = 52 − 4, and b = 8

(c) (2 *b + 4) + (b + 7) = 4b, so b = 11

1.6 $(x - 3)(x - 6) = x^2 -(6 + 3)x + 6*3 = x^2 -11x + 22$

Therefore: 6 + 3 = b + 1m so b = 8
Also, $6*3 = (18)_{10} = (22)_8$

1.7 $68BE = 0110\_1000\_1011\_1110 = 110\_100\_010\_111\_110 = (64276)_8$

1.8   **(a)** Results of repeated division by 2 (quotients are followed by remainders):

$431_{10} = 215(1);$ 107(1);   53(1); 26(1); 13(0); 6(1)   3(0)   1(1)
Answer: $1111\_1010_2 = FA_{16}$

(b) Results of repeated division by 16:

$431_{10} = 26(15);$ 1(10) (Faster)
Answer: FA = 1111_1010

1.9   **(a)** $10110.0101_2 = 16 + 4 + 2 + .25 + .0625 = 22.3125$

(b) $16.5_{16} = 16 + 6 + 5*(.0615) = 22.3125$

(c) $26.24_8 = 2 * 8 + 6 + 2/8 + 4/64 = 22.3125$