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-12	14	15	16	17	18	19	1A	1B	20	21	22	23	24	25	26	27	28

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

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

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

$(435)_8 = 4 * 8^2 + 3 * 8^1 + 5 * 8^0 = 285_{10}$

$(345)_6 = 3 * 6^2 + 4 * 6^1 + 5 * 6^0 = 137_{10}$

1.4 16-bit binary: 1111_1111_1111_1111
Decimal equivalent: $2^{16} - 1 = 65{,}535_{10}$
Hexadecimal equivalent: $FFFF_{16}$

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 $64CD_{16} = 0110\_0100\_1100\_1101_2 = 110\_010\_011\_001\_101 = (62315)_8$

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

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

(b) Results of repeated division by 16:

$431_{10} = 26(15);\quad 1(10)$ (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) $26.24_8 = 2 * 8 + 6 + 2/8 + 4/64 = 22.3125$

(d) $DADA.B_{16} = 14*16^3 + 10*16^2 + 14*16 + 10 + 11/16 = 60{,}138.6875$