

- 1-5 Let  $b = \text{base}$ . (a)  $14/2 = (b + 4)/2 = 5$ .  $b = 10 - 4 = 6$ .  
 (b)  $54/4 = (5*b + 4)/4 = b + 3$   $b = 12 - 4 = 8$ .  
 (c)  $24 + 17 = 2*b + 4 + b + 7 = 4*b$   $b = 4 + 7 = 11$

1-7  $(10110.0101)_2 = 16 + 4 + 2 + 1/4 + 1/16 = 22 + 5/16 = 22.3125$ ;  
 $(16.5)_{16} = 16 + 6 + 5/16 = 22 + 5/16 = 22.3125$ ;  
 $(26.24)_8 = 16 + 6 + 2/8 + 4/64 = 22 + 20/64 = 22 + 5/16 = 22.3125$ .

1-9  $68BE = 0110\ 1000\ 1011\ 1110 = 110\ 100\ 010\ 111\ 110 = 64276$  (octal).

- 1-18 (a)  $11011 + 00111 = 00010$  ( $27 - 25 = 2$ )  
 (b)  $110100 - 010101 = 110100 + 101011 = 011111$  ( $52 - 21 = 31$ )  
 (c)  $001011 + 010000 = 011011 \rightarrow -100101$  ( $11 - 48 = -37$ ) No carry implies negative.  
 (d)  $101010 + 010101 = 111111 \rightarrow -000001$  ( $42 - 43 = -1$ )

1-20  $+61 \rightarrow 0111101$  (needs a leading 0 to be positive).  $+27 \rightarrow 0011011$  (needs leading 0's to be positive and equal in length to  $+61$ ). Then,  $-61 = 1000011$  and  $-27 = 1100101$ .

$(+27) + (-61) = 0011011 + 1000011 = 1011110$  ( $-34$ ).

$(-27) + (+61) = 1100101 + 0111101 = 0100010$  ( $+34$ ).

$(-27) + (-61) = 1100101 + 1000011 = 0101000$  Overflow - must use 8 digits to accommodate the sum ( $-88$ ).

$(-27) + (-61) = 11100101 + 11000011 = 10101000$  ( $-88$ ) .

1-29

01001010 11101111 01101000 01101110 00100000 11000100 11101111 11100101

J o h n D o e

(b) Parity is odd.

1-34 F goes high only when *all* inputs are high; G goes high when *any* input is high.

