Answers for Number System Exercises

1	a)	00100111
	b)	00111011
	c)	1000000000
	d)	00111111
	e)	100000000

2	a)	13
	b)	27
	c)	11
	d)	36
	e)	15

3	a)	A
	b)	10
	c)	18
	d)	27
	e)	A3

4	a)	15
	b)	21
	c)	165
	d)	78
	e)	255

5	a)	B7
	b)	9C
	c)	C
	d)	26
	e)	37

6	a)	11111001
	b)	00011010
	c)	11011000
	d)	00001011
	e)	00001000

Answers for Number System Exercises

```
7)   a)       1011        11
         +   1101        13
             -----
             11000        24

     b)       1110        14
         +   1111        15
             -----
             11101        29

     c)      10001        17
         +     101         5
             -----
             10110        22

     d)        101         5
         +   10101        21
             -----
             11010        26

     e)        111         7
         +     111         7
             ---
             1110        14




8)   a)       1111
         -   1000
             ----
             0111

     b)       1101
         -   1011
             ----
             0010

     c)       1110
         -      11
             ----
             1011
```

Answers for Number System Exercises

```
d)      10101010
     -      1111
        --------
        10011011
```

```
e)      11000
     -    111
        -----
        10001
```

Another way of doing these calculations is to negate the number being subtracted, and then add it to the first number. This means that the processor doesn't need to have any subtraction circuits built into the Arithmetic unit.

```
a)      00001111
     +  11111000    8-bit 2's Comp for -8
        --------
        00000111    (15 - 8 = 7)
```

```
b)      00001101
     +  11110101    8-bit 2's Comp for -11
        --------
        00000010    (13 - 11 = 2)
```

```
c)      00001110
     +  11111101    8-bit 2's Comp for -3
        --------
        00001011    (14 - 3 = 11)
```

```
d)      10101010
     +  11110001    8-bit 2's Comp for -15
        --------
        10011011    (170 - 15 = 155)
```

```
e)      00011000
     +  11111001    8-bit 2's Comp for -7
        --------
        00010001    (24 - 7 = 17)
```

Answers for Number System Exercises

9   a)   38
          b)   -7
          c)   −19
          d)   85
          e)   −112

10   a)   15
          b)   -116
          c)   −52
          d)   −93
          e)   −16

11   a)   00000101
          b)   10000101
          c)   11111111
          d)   11000011
          e)   10000000

12   a)   00001010
          b)   11110110
          c)   01111111
          d)   10000001
          e)   10000000