Computer Arithmetic

EVALUATION SHEET

1. Add the following pairs of octal and binary numbers.

a. $34_8 + 5_8$

b. $66_8 + 65_8$

c. $735_8 + 116_8$

d. $111101_2 + 100101_2$

e. $111111_2 + 101101_2$

f. $10010011_2 + 11011101_2$

Answers

a. 41_8
b. 153_8
c. 1053_8
d. 1100010
e. 1101100
f. 101 110 000

2. Subtract the following pairs of octal and binary numbers using the *direct subtraction* method.

a. $74_8 - 6_8$

b. $527_8 - 70_8$

c. $7027_8 - 2474_8$

d. $1110100_2 - 1010101_2$

e. $11000000_2 - 101011_2$

f. $10101000_2 - 1000110_2$

Answers

a. 66_8
b. 437_8
c. 4333_8
d. 11111
e. 10010101
f. 1100010

3. Subtract the following pairs of octal and binary numbers using the *complementary addition* method. *Ignore overflow* when recording your answer.

a. $732_8 - 61_8$

b. $410_8 - 104_8$

c. $601_8 - 15_8$

d. $11010001_2 - 11001101_2$

e. $10010011_2 - 1110111_2$

f. $10100110_2 - 10011001_2$

Answers

a. 651_8
b. 304_8
c. 564_8
d. 00 000 100
e. 00 011 100
f. 00 001 101

4. Express each of the following decimal and octal numbers in the binary format specified.

   Express in *8-bit two's complement* binary format:

   a. 6_{10}

   b. -111_8

   Express in *16-bit two's complement* binary format (include – sign where necessary):

   c. -4801_{10}

   d. 30406_8

   Answers

	Octal Conversion	Binary Answer
a.	$+6_8$	00 000 110
b.	-111_8	10 110 111
c.	-11301_8	1 110 110 100 111 111
d.	$+30406_8$	0 011 000 100 000 110

5. Convert each of the following binary numbers into its octal equivalent. Be sure to include both sign (+ or –) and octal notation (8) in *every* answer.

   Convert from *8-bit two's complement* format to octal:

   a. $11\ 010\ 111_2$

   b. $01\ 010\ 000_2$

   Convert from *16-bit two's complement* format to octal:

   c. $1\ 101\ 110\ 101\ 110\ 000_2$

   d. $0\ 000\ 100\ 011\ 001\ 111_2$

   Answers

   a. -051_8 or -51_8
   b. $+120_8$
   c. -21220_8
   d. $+04317_8$ or $+4317_8$