

Worksheet - Number Bases

1. Convert the following binary numbers to equivalent decimal numbers.

- (a) $(1101)_2$
- (b) $(11101)_2$
- (c) $(0101\ 1101)_2$
- (d) $(1101\ 1101)_2$
- (e) $(1111\ 1111)_2$
- (f) $(0101\ 1001)_2$
- (g) $(1101\ 1101\ 0101)_2$
- (h) $(11100.101)_2$

2. Convert the following decimal numbers to equivalent binary numbers.

- (a) $(57)_{10}$
- (b) $(45)_{10}$
- (c) $(255)_{10}$
- (d) $(256)_{10}$
- (e) $(2416)_{10}$
- (f) $(4195)_{10}$

3. Convert the following octal numbers to equivalent decimal numbers.

- (a) $(45)_8$

- (b) $(2243)_8$

4. Convert the following decimal numbers to equivalent octal numbers.

- (a) $(19)_{10}$

- (b) $(132)_{10}$

- (c) $(512)_{10}$

5. Convert the following hexadecimal numbers to equivalent decimal numbers.

- (a) $(B4)_{16}$

- (b) $(1FF)_{16}$

- (c) $(28AD)_{16}$

6. Convert the following decimal numbers to equivalent hexadecimal numbers.

- (a) $(19)_{10}$

- (b) $(312)_{10}$

- (c) $(513)_{10}$

7. Convert the following binary numbers to equivalent octal numbers.

- (a) $(1\ 1101)_2$
- (b) $(1\ 0110\ 1101)_2$
- (c) $(1011\ 0101)_2$

8. Convert the following binary numbers to equivalent hexadecimal numbers.

- (a) $(10\ 1010)_2$
- (b) $(1\ 1110\ 0110)_2$
- (c) $(1101\ 0101)_2$

9. Miscellaneous - Perform the following base conversions

- (a) $(141)_5 = (?)_{10}$
- (b) $(36)_{10} = (?)_7$
- (c) $(110\ 0101)_2 = (?)_4$ (Is there a shortcut way to do this?)

10. Perform the following unsigned **binary** arithmetic. Verify your answer by converting each problem into decimal. (Note: the last two are subtraction!)

a.
$$\begin{array}{r} 0111\ 0101 \\ + 0011\ 0011 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 0010\ 0110 \\ + 0101\ 1011 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 1001\ 0011 \\ + 0011\ 1011 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 0101\ 1100 \\ + 0001\ 1111 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 1001\ 1011 \\ - 0011\ 1011 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 0101\ 1001 \\ - 0001\ 1111 \\ \hline \end{array}$$

11. Perform the following **octal** arithmetic. Verify your results by converting each problem into decimal.

$$\begin{array}{r} \text{a. } 424 \\ + 163 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b. } 5112 \\ + 1346 \\ \hline \end{array}$$

12. Perform the following **hexadecimal** arithmetic. Verify your results by converting each problem into decimal. (Note: the last two are subtraction!)

$$\begin{array}{r} \text{a. } A4 \\ + 27 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b. } 7F3 \\ + 41D \\ \hline \end{array}$$

$$\begin{array}{r} \text{c. } 806 \\ - 4B \\ \hline \end{array}$$

$$\begin{array}{r} \text{d. } 56C \\ - 1FF \\ \hline \end{array}$$