

**Activity 2.3.1 Hexadecimal and Octal Number Systems**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Introduction

We all know that digital electronics use the binary number system. However, with new computers containing 32, 64, and even 128 bit data busses, displaying numbers in binary is quite cumbersome. For example, a single piece of data on a 64-bit data bus would look like this:

**0110100101110001001101001100101001101001011100010011010011001010**

Obviously, presenting data in this form would invite error. For this reason we use the hexadecimal (base 16) and, to a lesser extent, the octal (base 8) number systems.

In this activity you will learn how to convert numbers between the decimal, binary, octal, and hexadecimal number systems.

Equipment

Calculator (preferably one with a number base conversion feature)

Procedure

Complete the following **decimal-to-octal** number conversions. If available, use the base conversion feature of your calculator to check your answers.

1. 25 (10) = 11
2. 49 (10) = 11
3. 187 (10) =
4. 398 (10) =
5. 2879 (10) =

Complete the following **octal-to-decimal** number conversions. If available, use the base conversion feature of your calculator to check your answers.

1. 36 (8) =
2. 75 (8) =
3. 143 (8) =
4. 367 (8) =
5. 1735 (8) =

Complete the following **decimal-to-hexadecimal** number conversions. If available, use the base conversion feature of your calculator to check your answers.

1. 25 (10) =
2. 46 (10) =
3. 120 (10) =
4. 429 (10) =
5. 1215 (10) =

Complete the following **hexadecimal-to-decimal** number conversions. If available, use the base conversion feature of your calculator to check your answers.

1. 3B (16) =
2. A9 (16) =
3. 159 (16) =
4. 2A3 (16) =
5. 1AB3 (16) =

Utilize the shortcut base conversion technique to complete the following table.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Binary | Octal | Hexadecimal |
|  | 1010112 |  |  |
|  |  |  | 1A316 |
|  | 110101102 |  |  |
|  |  | 1378 |  |
|  | 1010111102 |  |  |