

Example 1: Convert the decimal number 15_{10} to binary

Wednesday, 19 August, 2020 11:46 AM

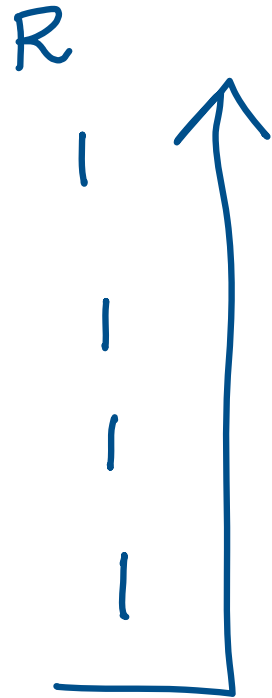
15_{10}

$$15 \div 2 \Rightarrow 7$$

$$7 \div 2 \rightarrow 3$$

$$3 \div 2 \rightarrow 1$$

$$1 \div 2 \rightarrow 0$$



$$15_{10} \Rightarrow 1111_2$$

Example 2: Convert the decimal number 343_{10} to binary

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$$343_{10} \Rightarrow 101010111_2$$

$$\frac{343}{2} \rightarrow 171$$

$$\frac{171}{2} \rightarrow 85$$

$$\frac{85}{2} \rightarrow 42$$

$$\frac{42}{2} \rightarrow 21$$

$$\frac{21}{2} \rightarrow 10$$

$$\frac{10}{2} \rightarrow 5$$

$$\frac{5}{2} \rightarrow 2$$

$$\frac{2}{2} \rightarrow 1$$

$$\frac{1}{2} \rightarrow 0$$

R
1
1
1
0
1
0

Example 3: Convert the binary number 1101_2 in the decimal form

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$$\begin{array}{cccc} & 2^3 & 2^2 & 2^1 & 2^0 \\ 1 & 1 & 0 & 1 & \end{array}$$

$$\Rightarrow (1 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0)$$

$$\Rightarrow 8 + 4 + 0 + 1 = 13_{10}$$

$$\begin{array}{cccc} & 2^3 & 2^2 & 2^1 & 2^0 \\ 8 & 4 & 2 & 1 & \\ 1 & 1 & 0 & 1 & \end{array}$$
$$\Rightarrow 8 + 4 + 1 = 13$$

Example 4: Convert the octal number 317_8 to binary.

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$317_8 \Rightarrow ()_2$

$\begin{array}{ccc} 3 & 1 & 7 \\ \hline & & \downarrow \\ 011 & 001 & 111 \end{array}$

01100111_2

$\begin{array}{cc} 2 & R \\ 3 & 1 \\ 1 & 1 \\ 0 & 1 \end{array}$

$\frac{7}{2}$
 $3\frac{1}{2}$
 $\frac{1}{2}$

↑

Example 5: Convert the hexadecimal number $F3A_{16}$ to binary

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$F3A_{16} \rightarrow (\quad)_2$

$F = 15$
 \underline{F}
1111

$3 =$
 $\underline{3}$
0011
8 4 2 1

$A = 10$
1010
8 4 2 1

11110011010₂

$F = 15$
Q R
15 7 1
 $\frac{15}{2}$ 7 1
7 $\frac{7}{2}$ 3 1
3 $\frac{3}{2}$ 1 1
1 $\frac{1}{2}$ 0 1

Example 6: Convert 11110110 to octal and to hexadecimal.

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011110110

octal

011 110 110
3 6 6

421
110
⇒ 6

421
011

hexa decimal.

1111 0110
F 6

F6₁₆

366₈

8421
1111
⇒ 15
↓
F

0110
8421

71543210
22222220
11110110₂

↓

()₁₀

Assignment Q1

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Convert the following binary numbers to decimal form

101
=

2. $\begin{matrix} 2^2 & 2^1 & 2^0 \\ 1 & 0 & 1 \end{matrix}$

1. $\begin{matrix} 8 & 4 & 2 & 1 \\ 0 & 1 & 0 & 1 \end{matrix}$
 $\Rightarrow 5$

$$= (1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0)$$

$$= 4 + 0 + 1$$

$$= 5 \checkmark$$

Assignment Q2

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Express the following decimal numbers in binary form

a. 7

$7 \Rightarrow 111_2$

$7/2$	2
$3/2$	3
$1/2$	1
0	0

R

1 1 1

421
 111
 $\Rightarrow 4+2+1$
 $= 7$

Assignment Q3

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Express each of the following octal numbers in binary, decimal, and hexadecimal forms

77_8

1. Binary \Rightarrow

 \Downarrow

7
 \Downarrow
111

7
 \Downarrow
111

111111₂

2. decimal

3.

0011
 \Downarrow
3

1111
 \Downarrow
F₁₆

5	4	3	2	1	0
2	2	2	2	2	2
1	1	1	1	1	1

=

Assignment Q4

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Express the following decimal numbers in binary, octal, and hexadecimal forms

a. 313 \Rightarrow 1. decimal $\frac{313}{2}$

2. octal

3. hexadecimal

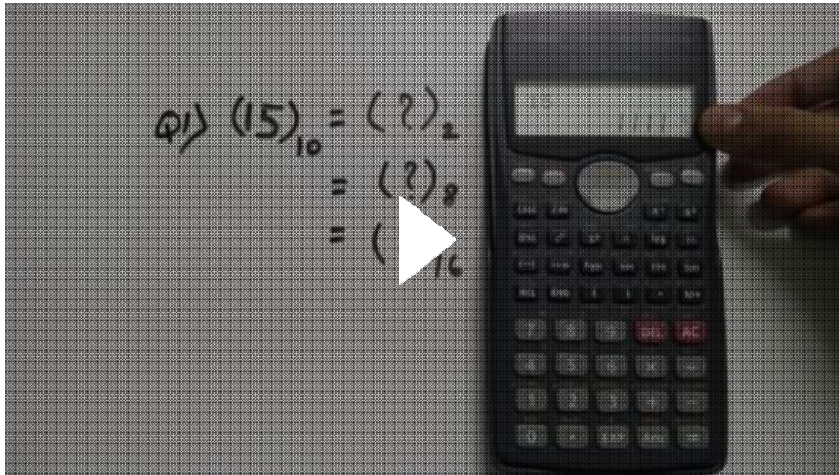
2 R
:
:
:
:
:
:
0

YouTube Video Links

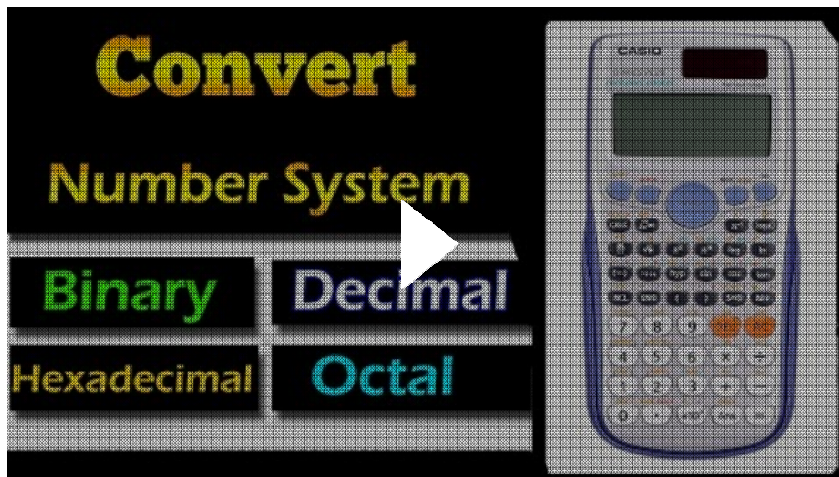
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[Number System Conversion - Decimal, Binary, Octal & Hexadecimal | Scientific Calc](#)



[Number Base Conversion in Scientific Calculator \(fx-991 ES plus\)](#)



[Casio Classwiz FX-991EX FX-87DEX FX-570EX Binary Decimal Hexadecimal Octal conversion](#)



CASIO fx-991EX
CLASSWIZ

OCTAL
Binary
Decimal
Hexadecimal



