



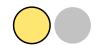
Two's complement: binary to denary 1

Convert the binary number 11101001 to denary. The binary value is encoded as an 8-bit two's complement number.

- 105
 - +233
 - 23
 - +105
-
-
-

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Two's complement: binary to denary 3

Convert the binary number 10001010 to denary. The binary value is encoded as an 8-bit **two's complement** number.

Quiz:

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Two's complement: denary to binary 1

Convert the value $+28_{10}$ to an 8-bit two's complement binary number.

- 11100000
 - 00011100
 - 011100
 - 11100100
-
-
-

Quiz:

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Two's complement: denary to binary 2

Convert the value -49_{10} to an 8-bit two's complement binary number.

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Two's complement: range 1

Signed integers can be stored in two's complement form. What is the range of values that can be stored using 8 bits in two's complement?

- +255 to -256
 - +127 to -128
 - +256 to -256
 - +128 to -128
-
-
-

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Signed fixed: binary to denary 1

Select the denary number that is the same value as the binary number 010110.1010

The number is represented using **two's complement fixed point form**, with 6 places before the binary point and 4 places after the binary point.

- 9.375 (or $-9\frac{3}{8}$)
 - 22.625 (or $22\frac{5}{8}$)
 - 5.65625 (or $5\frac{21}{32}$)
 - 11.3125 (or $11\frac{5}{16}$)
 - 362
-
-
-

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Challenge 2



Convert the binary number 100110.1110 to denary. It is represented in **two's complement fixed point form** with 6 places before the binary point and 4 places after the binary point.

Type your answer as a **signed decimal number** (e.g. +3.75). Do not leave any spaces in your answer.

Quiz:

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Signed fixed: denary to binary 1

Each binary number below is encoded as a **fixed point two's complement number** with 4 places before the binary point and 4 places after the binary point.

Select the binary number that is the same value as the denary number $5\frac{5}{8}$ (or $\frac{45}{8}$ or 5.625 as a decimal).

- 01011010
 - 00101101
 - 10100110
 - 10111010
-
-
-

Quiz:

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Signed fixed: denary to binary 3

Convert the denary number $-11\frac{3}{8}$ (or $-\frac{91}{8}$ or -11.375 as a decimal) to binary. It must be encoded as a **fixed point two's complement number** with 5 places before the binary point and 4 places after the binary point.

Type your answer as a 9-bit binary number **without a binary point** (e.g. 111110000). Do not leave any spaces in your answer.

Quiz:

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Absolute and relative error 1

Calculate the absolute and relative error that is caused due to the **truncated** representation of 0.2_{10} in binary using 8 bits.

Original value in denary	Truncated representation in binary using 8 bits	Absolute error	Relative error
0.2_{10}	0.0011010_2	?	?

Part A

Calculate the value of the **absolute error** in denary.

Part B

Using your answer for the absolute error in Part A, calculate the value of the **relative error** as a percentage (but do not include the percentage sign).

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