Two's complement: binary to denary 1

GCSE P P A Level P P

Convert the value 00101011_2 to a denary (base 10) number. The binary value is encoded as an 8-bit two's complement number.

Two's complement: binary to denary 3

GCSE C C A Level C C

Using **8-bit two's complement representation**, convert the following binary number into denary.

10001010_2

Two's complement: denary to binary 1

GCSE A Level

P P P P

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

- 11100000
- 00011100
- 11100100
- 011100

Two's complement: denary to binary 2

GCSE A Level

P P P P

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

Two's complement: range 1

A Level

P P

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?

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

Signed fixed: binary to denary 2

A Level

C C

Convert the binary number 101011.10110 to denary. It is represented in **two's complement fixed point form** with 6 places before the binary point and 5 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.

Signed fixed: denary to binary 2

A Level

C C

Convert the denary number $-11\frac{3}{8}$ (or $\frac{91}{8}$ or -11.375 as a decimal) to binary, encoding the number as an **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.

Signed fixed: denary to binary 3

A Level

C C

Convert the denary number $-\frac{3}{64}$ (or -0.046875 as a decimal) to binary, encoding the number as an **fixed point two's complement number** with 4 places before the binary point and 6 places after the binary point.

Type your answer as a 10-bit binary number without a binary point (e.g. 1111100001) - do not leave any spaces in your answer.

Signed fixed: denary to binary 4

A Level

Convert the denary number $-\frac{6}{64}$ (or -0.09375 as a decimal) to binary, encoding the number as an **fixed point two's complement number** with 4 places before the binary point and 6 places after the binary point.

Type your answer as a 10-bit binary number without a binary point (e.g. 1111100001) - do not leave any spaces in your answer.

Absolute and relative error 2

A Level

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	?	?

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

Enter the value of the **relative error** as a percentage (but do not include the percentage sign).