

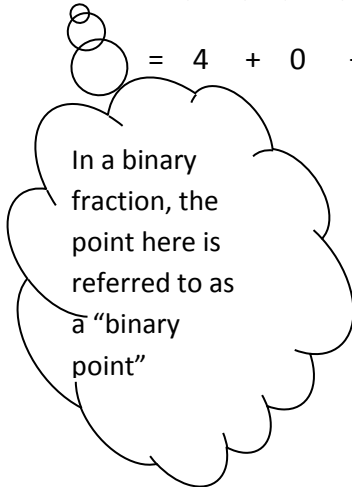


Binary Fractions

Example #1: Use binary expansion to convert binary fractions into decimals.

$$101.1101_2 = (1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0) + (1 \times 2^{-1}) + (1 \times 2^{-2}) + (0 \times 2^{-3}) + (1 \times 2^{-4})$$

$$= 4 + 0 + 1 + 0.5 + 0.25 + 0 + 0.0625 = 5.8125_{10}$$



Now you try some:

Find the decimal equivalent for each binary fraction.

- a. 1101.0111
- b. 111.111
- c. 101.01011

Example #2: Convert 13.6875_{10} to a binary fraction.

PART A:

Convert 13 to binary in the ordinary way.

2	13	R=1
2	6	R=0
2	3	R=1
2	1	R=1 ↑read↑
	0	

Therefore, $13_{10} = 1101_2$

PART B:

Convert the decimal part in the following manner:

Read Down INTEGER PART

$.6875 \times 2 = 1.375$		1
$.375 \times 2 = 0.75$		0
$.75 \times 2 = 1.50$		1
$.5 \times 2 = 1.00$		1

Therefore, $.6875_{10} = .1011_2$

Hence,
 $13.6875_{10} = 1101.1011_2$

Now you try some:

Find the binary equivalent for each decimal fraction.

- a. 32.45 b. 28.555 c. 7.0202