

Decimal to Binary

$$1 \rightarrow 1$$

$$2 \rightarrow 10$$

$$1.5 \rightarrow 1.1$$

$$4.125 \rightarrow 100.001$$

$$1.75 \rightarrow 1.11$$

$$15.75 \rightarrow 1111.11$$

$$0.75 \rightarrow 0.11$$

$$9.625 \rightarrow 1001.101$$

$$(0.011)_2 = (1.1)_2 \times 2^{-2}$$

$$(1010)_2 = (1.010)_2 \times 2^3$$

$$4.625 = 100.101$$

$$= 1.00101 \times 2^2$$

$$(-1)^s \times \left(1 \cdot \overbrace{\text{1.} \dots \text{1}}^m \right) \times 2^x$$

(Note: The diagram above the fraction line in the original image shows a '1' at the start of the mantissa and an arrow pointing to 'm' for the rest of the bits. Below the fraction line, an arrow points from '1.' to '23', indicating 23 bits of precision.)

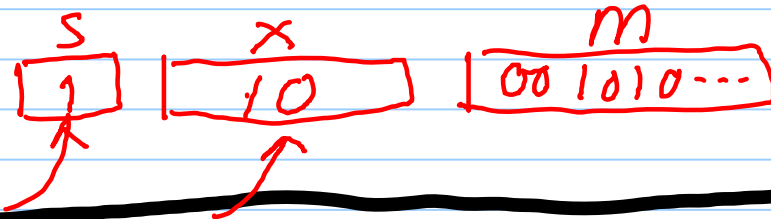


IMPORTANT

$$-4.625 \rightarrow 100.101$$

$$S = 1$$

$$\text{normal form} = 1.\overbrace{00101}^m \times 2^{\textcircled{2}}$$



$$9.375$$

$$S = 0$$

$$\rightarrow 1001.011 \rightarrow 1.001011 \times 2^3$$

