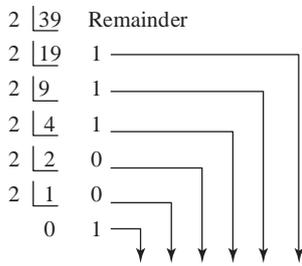


3. (a) 0.1101 (b) 0.11001 (c) 0.00111 (d) 0.01011
 4. (a) 11010.11 (b) 10111.011
 (c) 110101.0111 (d) 11010101.10111

5.3 Conversion of denary to binary

An integer denary number can be converted to a corresponding binary number by repeatedly dividing by 2 and noting the remainder at each stage, as shown below for 39₁₀

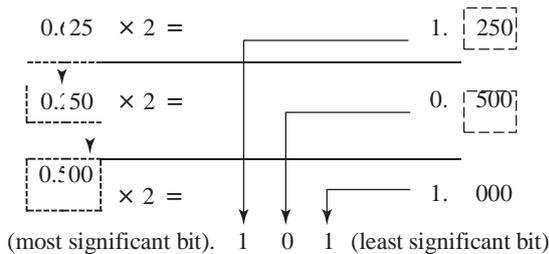


(most significant bit) → 1 0 0 1 1 1 ← (least significant bit)

The result is obtained by writing the top digit of the remainder as the least significant bit, (a bit is a **binary digit** and the least significant bit is the one on the right). The bottom bit of the remainder is the most significant bit, i.e. the bit on the left.

Thus 39₁₀ = 100111₂

The fractional part of a denary number can be converted to a binary number by repeatedly multiplying by 2, as shown below for the fraction 0.625

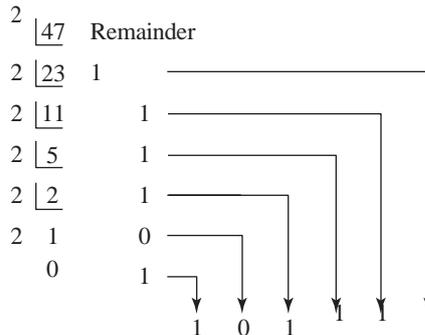


For fractions, the most significant bit of the result is the top bit obtained from the integer part of multiplication by 2. The least significant bit of the result is the bottom bit obtained from the integer part of multiplication by 2.

Thus 0.625₁₀ = 0.101₂

Problem 4. Convert 47₁₀ to a binary number.

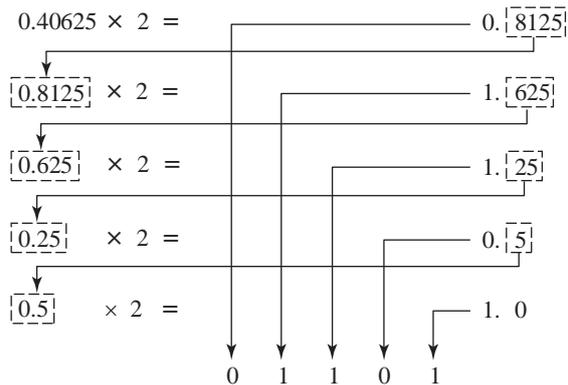
From above, repeatedly dividing by 2 and noting the remainder gives:



Thus 47₁₀ = 101111₂

Problem 5. Convert 0.40625₁₀ to a binary number.

From above, repeatedly multiplying by 2 gives:



i.e. 0.40625₁₀ = 0.01101₂

Problem 6. Convert 58.3125₁₀ to a binary number.

The integer part is repeatedly divided by 2, giving:

