

1 Binary numbers – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English

Write it 3 times (English)

binary

bit

denary

Recall

Computers store everything in **binary** – using only the digits 0 and 1. Each digit is a **bit**.

New ideas

Read these first, then do the Practice.

■ 1 Binary to denary

Each binary column has a place value (a power of 2). Add the values where there is a 1:

128	64	32	16	8	4	2	1
0	0	1	0	1	1	0	1

$= 32 + 8 + 4 + 1 = 45$

■ 2 Binary addition

Add in binary just like in **denary** , but carry when a column reaches 2:

$$\begin{array}{r} 0101 \\ + 0011 \\ \hline 1000 \end{array} \quad 5 + 3 = 8$$

Watch out: read binary place values from the **left**: 128, 64, 32, 16, 8, 4, 2, 1. When adding, **carry** to the next column whenever a column reaches 2 ($1 + 1 = 10$ in binary).

Practice

Try these in order.

1.1 Which two digits does binary use? [1]

1.2 What is a *bit*? [1]

1.3 Convert the binary number 1010 to denary. [2]

1.4 Convert the binary number 0001 0000 to denary. [1]

1.5 Work out $0011 + 0001$ in binary. [2]

1.6 Challenge. Convert the binary number 1101 0010 to denary. [3]