Unit 1 Section 3 : Multiplying Binary Numbers

Long multiplication can be carried out with binary numbers and is explored in this section.

Note that multiplying by numbers like 10, 100 and 1000 is very similar to working with base 10 numbers.

Example 1

Calculate the binary numbers:

(a) 1011×100

(b) 110110×1000

(c) 11011×10000

LIVEWORKSHEETS

Example 2

Calculate the binary numbers:

(a) 1011×11

(b) 1110×101

(c) 11011×111

(d) 11011×1001

Question 1
Calculate the binary numbers:

(a) 111×10

(b) 1100×100

(c) 101×1000

(d) 11101×1000

(e) $10100 \div 10$

(f) $1100 \div 100$

LIVEWORKSHEETS

Question 2
Calculate the binary numbers:

(a) 111×11

(b) 1101×11

(c) 1101×101

(d) 1111×110

(e) 11011×1011

(f) 11010×1011

(g) 10101×101

(h) 10101×111

(i) 10101×110

(j) 100111×1101

Question 3
Solve the following equations, where all numbers, including x, are binary:

(a) $\frac{x}{11} = 110$ $x =$

(b) $\frac{x}{101} = 101$ $x =$

(c) $\frac{x}{10} = 111$ $x =$

(d) $\frac{x}{111} = 1011$ $x =$

LIVEWORKSHEETS

Question 4
Multiply each of the following binary numbers by itself:

(a) 11

(b) 111

(c) 1111

What do you notice about your answers to parts (a), (b) and (c)?
What will you get if you multiply 11111 by itself?

Question 5
Multiply each of the following binary numbers by itself:

(a) 101

(b) 1001

(c) 10001

(d) 100001

What would you expect to get if you multiplied 1000001 by itself?

Question 6
Calculate the binary numbers:

(a) 101 (110 + 1101)

(b) 1101 (1111 – 110)

(c) 111 (1000 – 101)

(d) 1011 (10001 – 1010)

LIVEWORKSHEETS

Question 7
Here are 3 binary numbers:

11011 11100 10011

Working in binary,

(a) multiply the two *larger* numbers,

(b) multiply the two *smaller* numbers.

Question 8

(a) Multiply the base 10 numbers 45 and 33.

(c) Convert 45 and 33 to binary numbers.

or

(b) Convert your answer to a binary number.

(d) Multiply the binary numbers obtained in part (c) and compare this answer with your answer to part (b).



(b)

LIVEWORKSHEETS