



PRIMARY SEVEN MATHEMATICS SELF - STUDY LESSONS SET 2

LESSON 1

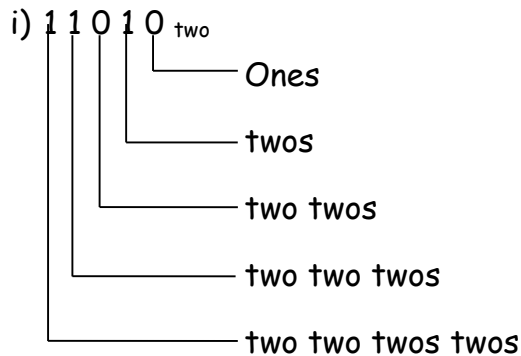
BASE TWO

Grouping in twos is a system of counting called base two (Binary system). Digits used in base two are 0, 1

Place values of base two

Example

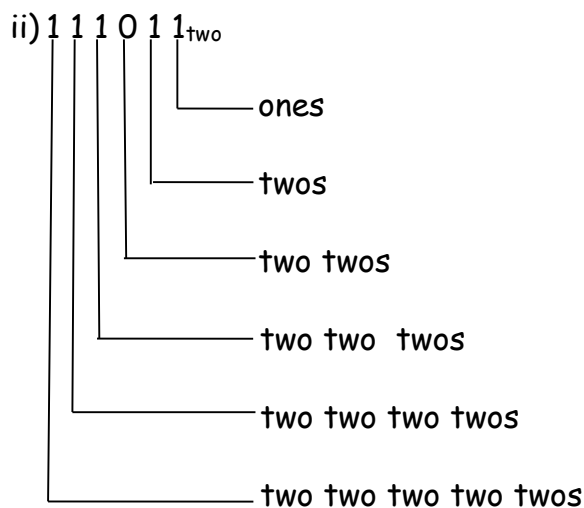
1. Write the place value of each digit in base two



Read as in words

11010_{two}

One, one, zero, one, zero base two



Read as in words

111011_{two}

One, one, one, zero, one, one base two

Activity

1. Write the place value of the following in base two

a) 101_{two}

b) 11_{two}

c) 1011_{two}

d) 1110_{two}

e) 11001_{two}

f) 11011_{two}

g) 110111_{two}

h) 1101_{two}

i) 11111_{two}

j) 111011_{two}

2. Write the following in words

a) 1101_{two}

b) 111_{two}

c) 110_{two}

d) 1110_{two}

e) 1111_{two}

f) 1011_{two}

g) 11011_{two}

h) 110111_{two}

i) 1010_{two}

j) 10001_{two}

3. Write the place value of the underlined digits in base two

a) $1\underline{0}1_{\text{two}}$

b) $\underline{1}111_{\text{two}}$

c) $1\underline{1}01_{\text{two}}$

d) $111\underline{1}_{\text{two}}$

e) $\underline{1}011_{\text{two}}$

f) $1\underline{0}101_{\text{two}}$

g) $10\underline{1}11_{\text{two}}$

h) $\underline{111}_{\text{two}}$

LESSON 2

Expanding numbers in base two

Example

1. Expand the following

1010_{two}

a)

No.	1	0	1	0
Base	2^3	2^2	2^1	2^0

$$\underline{(1 \times 2^3) + (0 \times 2^2) + (1 \times 2^1) + (0 \times 2^0)}$$

11011_{two}

b)

No.	1	1	0	1	1
Base	2^4	2^3	2^2	2^1	2^0

$$\underline{(1 \times 2^4) + (1 \times 2^3) + (0 \times 2^2) + (1 \times 2^1) + (1 \times 2^0)}$$

Activity

1. Expand the following

a) 1101_{two}

b) 11_{two}

c) 110_{two}

d) 101_{two}

e) 1010_{two}

f) 1001_{two}

g) 11011_{two}

h) 1111_{two}

i) 10001_{two}

j) 100_{two}

k) 11010_{two}

l) 101010_{two}

LESSON 3

Changing from binary (base two to base ten)

Example

Change 1101_{two} to base ten

a)

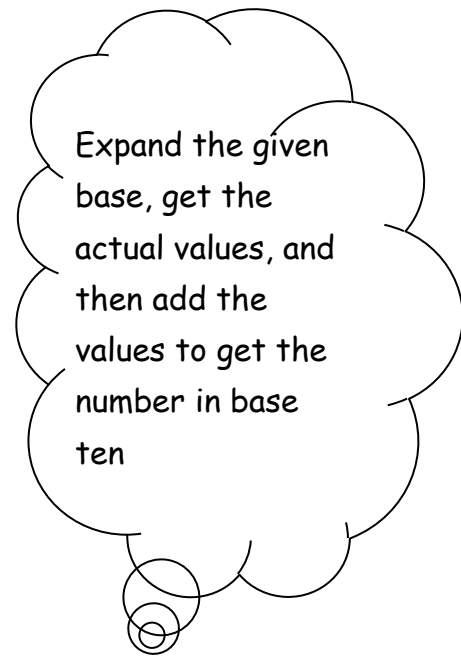
No.	1	1	0	1
Base	2^3	2^2	2^1	2^0

$$= (1 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0)$$

$$= (1 \times 2 \times 2 \times 2) + (1 \times 2 \times 2) + (0 \times 2) + (1 \times 1)$$

$$= 8 + 4 + 0 + 1$$

$$= \underline{13}_{\text{ten}}$$



Activity

1. Change the following to base ten

a) 11_{two}

b) 110_{two}

c) 101_{two}

d) 1101_{two}

e) 11010_{two}

f) 1010_{two}

g) 11001_{two}

h) 1111_{two}

i) 10111_{two}

j) 11100_{two}