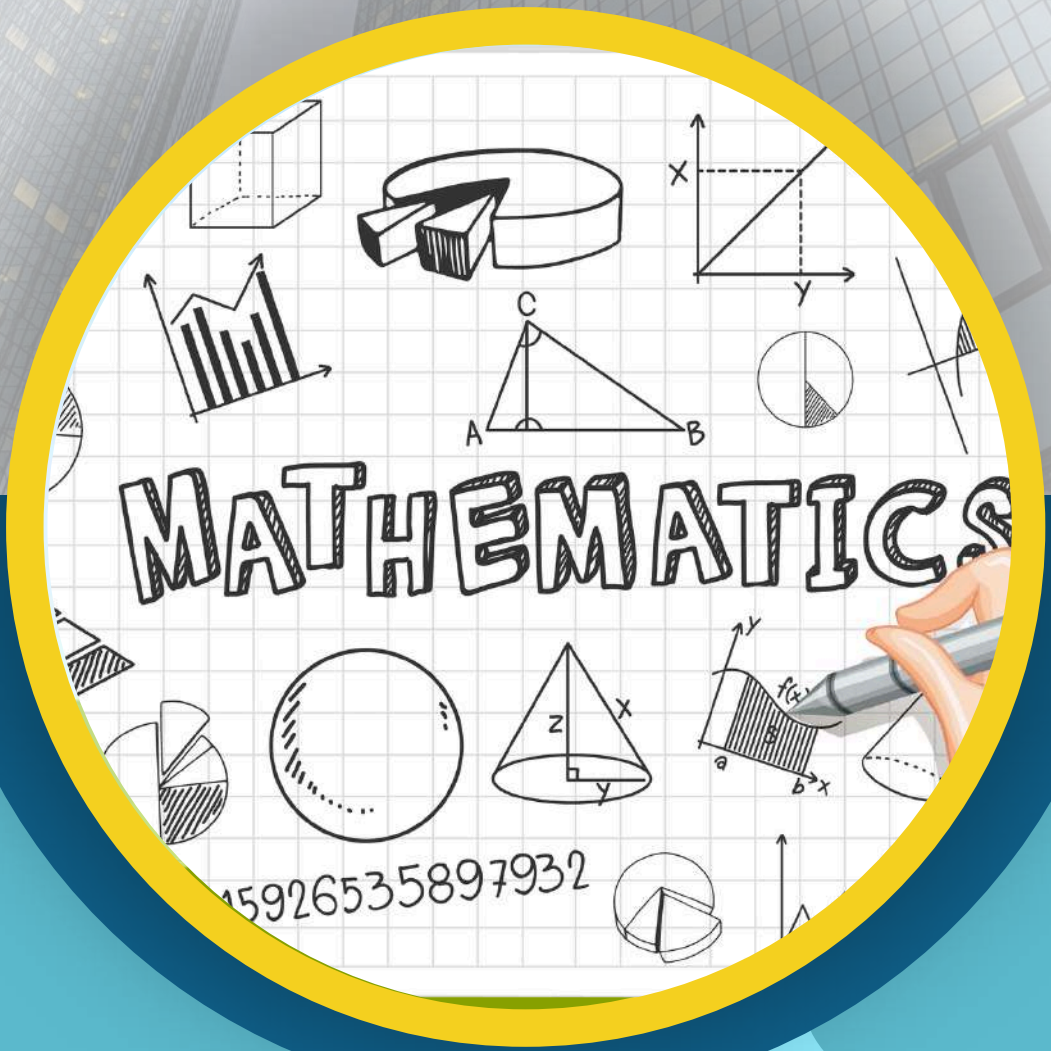
CALCULUS & ALGEBRA



NUMBERING SYSTEM
VOLUME 1

AUTHOR / ILLUSTRATOR
NOR LIAN MOHD NORDIN

EDITOR
NITHYA PERIASAMY

CALCULUS & ALGEBRA

NUMBERING SYSTEM

VOLUME 1

BY:

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POLITEKNIK UNGKU OMAR

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CALCULUS & ALGEBRA

NUMBERING SYSTEM

VOLUME 1

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Nor Lian Mohd Nordin has 21 years teaching experience in Politeknik Ungku Omar (PUO) since year 2002. Nor Lian graduated with Bachelor Degree in Electrical Engineering from University Technology Malaysia (UTM) in 1997 and completed her Masters in Education (Technical) from University Technology Malaysia (UTM) in 2002. She was Head of Computer Unit from 2019 to 2021, before moving up the grade.

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PREFACE

The book is about Calculus & Algebra Volume 1 on Chapter 1 Numbering Systems.This topic introduces the basic rules of numbering systems. It also covers on finding the values and converting numbering numbers. This book contains the rules, examples, exercises and quizzes for each of the sub topic.

Table of Contents

Numbering System

1.0 - NUMBERING SYSTEM

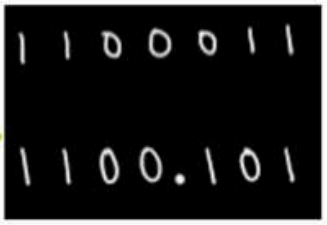
1.1 - CONCEPTS OF NUMBERING SYSTEM

TYPES OF NUMBERING SYSTEM

BINARY

- Base 2
- Consist of two values, 0 and 1

EXAMPLE



DECIMAL

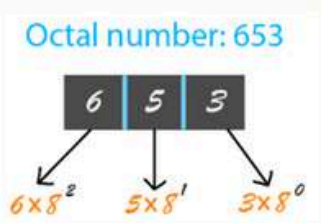
- Base 10
- Consist of ten values, 0,1,2,3,4,5,6,7,8,9

EXAMPLE

OCTAL

- Base 8
- Consist of eight values, 0,1,2,3,4,5,6,7

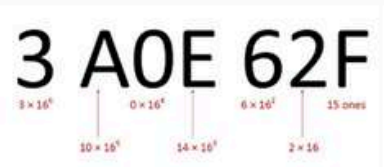
EXAMPLE



HEXADECIMAL

- Base 16
- Consist of sixteen values,0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F

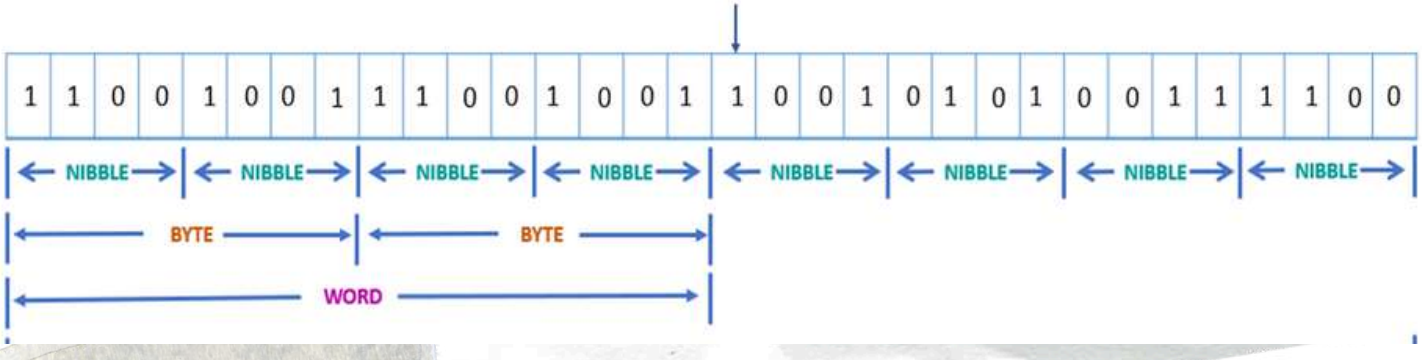
EXAMPLE

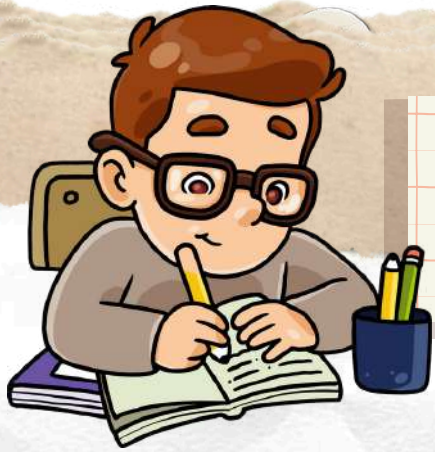


1.2 - DATA ORGANIZATION

A group of 8 bits together is called a byte	A group of 4 bits together is called a nibble	BIT A bit is a single 0 or 1 on its own
10101110	1010	1

A group of 16 bits together is called a word	A group of 32 bits together is called a doubleword
1010111010110011	11110100010011100110100000011111





TRY THIS!

1

- **Define data organization of the following:**

1) bit
2) nibble
3) byte
4) word

2

- **Change the following:**

1) 3 words in nibbles
2) 16 nibbles in bytes
3) 8 bytes in nibbles
4) 24 bits in nibbles
5) 5 words in bits
6) 128 bytes in double words
7) 3 nibbles to bit
8) 1 double words to word
9) 12 bytes to nibbles

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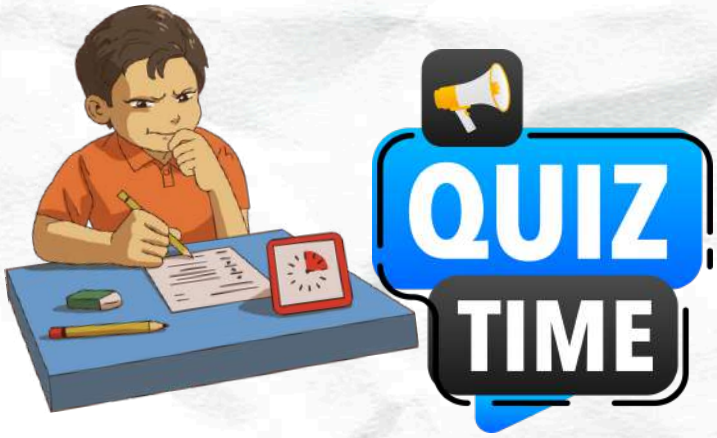
Check answers:
https://tinyurl.com/Answernum1



https://www.proprofs.com/quiz-school/ugc/story.php?title=mzc4ntmynauamx

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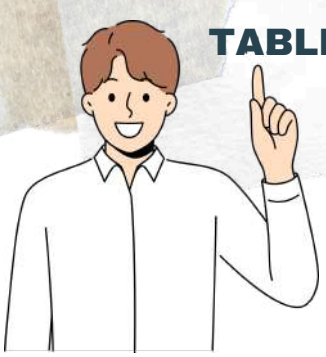
BACK

1.3 - BINARY SYSTEM

DECIMAL	BINARY					OCTAL	HEXADECIMAL
0	0	0	0	0	0	0	0
1	0	0	0	0	1	1	1
2	0	0	0	1	0	2	2
3	0	0	0	1	1	3	3
4	0	0	1	0	0	4	4
5	0	0	1	0	1	5	5
6	0	0	1	1	0	6	6
7	0	0	1	1	1	7	7
8	0	1	0	0	0	10	8
9	0	1	0	0	1	11	9
10	0	1	0	1	0	12	A
11	0	1	0	1	1	13	B
12	0	1	1	0	0	14	C
13	0	1	1	0	1	15	D
14	0	1	1	1	0	16	E
15	0	1	1	1	1	17	F
16	1	0	0	0	0	20	10
17	1	0	0	0	1	21	11
18	1	0	0	1	0	22	12

TABLE 1: NUMBERING SYSTEM



A

1.3.1 - ADDITION & SUBTRACTION IN BINARY

BINARY NUMBER - ADDITION

HELPFUL TIPS

Rules of Binary Addition

- 0 + 0 = 0
- 0 + 1 = 1
- 1 + 0 = 1
- 1 + 1 = 2 (BUT IN BINARY, IT BECOMES 1 AND 0)

EXAMPLE 1 :

Solve the following Binary numbers:

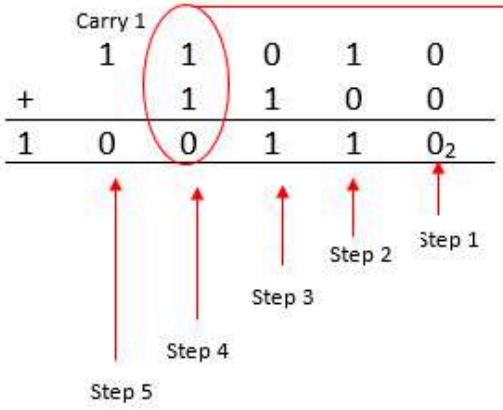
11010 + 1100 =

SOLUTION:

1 + 1 = 2, but in binary 2 is equal to 1 and 0 (refer to the table).

So, 0 remain below, 1 is carried up

DECIMAL	BINARY					OCTAL	HEXADECIMAL
0	0	0	0	0	0	0	0
1	0	0	0	0	1	1	1
2	0	0	0	1	0	2	2
3	0	0	0	1	1	3	3



step 1:
0 + 0 = 0

step 2:
1 + 0 = 1

step 3:
0 + 1 = 1

step 4:
1 + 1 = 10 (from table)
so, carry 1 and 0 stay below

step 5:
1 + 1 + 0= 10 (from table)
so, carry 1 and 0 stay below

The answer is
100110 (base 2)

1.3.1 - ADDITION & SUBTRACTION IN BINARY

BINARY NUMBER - ADDITION

EXAMPLES : Solve the following Binary numbers:

2) **0111 + 0110 =**

SOLUTION:

1 + 1 = 2, but in binary, 2 is equal to 1 and 0 (refer to the table).

So, 0 remain below, 1 is carried up

DECIMAL	BINARY					OCTAL	HEXADECIMAL
0	0	0	0	0	0	0	0
1	0	0	0	0	1	1	1
2	0	0	0	1	0	2	2
3	0	0	0	1	1	3	3

	Carry 1	Carry 1		
	1	1	1	
+	1	1	0	
1	1	0	1	$_2$

1 + 1 + 1 = 3, but in binary, 3 is equal to 1 and 1 (refer to the table).

So, 1 remain below, the other 1 is carried up

Answer = 1101 (base 2)

3) **01101011 + 101000111 =**

SOLUTION:

1 + 1 = 2, but in binary, 2 is equal to 1 and 0 (refer to the table).

So, 0 remain below, 1 is carried up

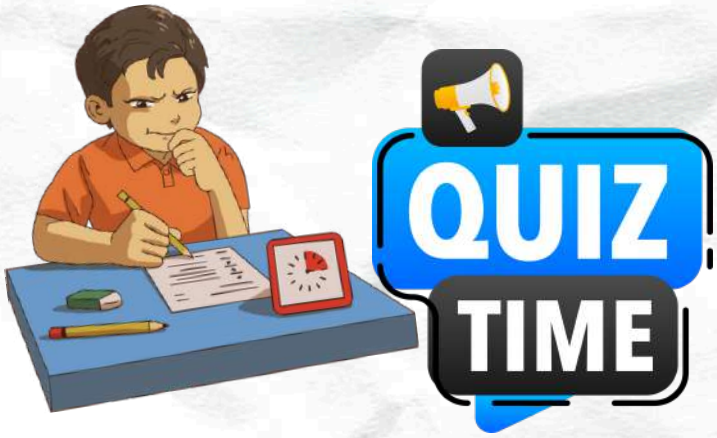
DECIMAL	BINARY					OCTAL	HEXADECIMAL
0	0	0	0	0	0	0	0
1	0	0	0	0	1	1	1
2	0	0	0	1	0	2	2
3	0	0	0	1	1	3	3

	Carry 1	Carry 1	Carry 1	Carry 1	Carry 1			
	Carry 1	1	1	0	1	0	1	1
+	1	0	1	0	0	1	1	1
1	0	0	0	1	0	0	1	0 $_2$

1 + 1 + 1 = 3, but in binary, 3 is equal to 1 and 1 (refer to the table).

So, 1 remain below, the other 1 is carried up

Answer = 100010010 (base 2)



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1.3.1 - ADDITION & SUBTRACTION IN BINARY

BINARY NUMBER - SUBTRACTION

HELPFUL TIPS

Rules of Binary Subtraction

- 0 - 0 = 0
- 1 - 0 = 1
- 1 - 1 = 0
- 0 - 1 = (WITH A BORROW OF 1)

EXAMPLES: Solve the following Binary numbers:

1) 101 - 11 =

SOLUTION:

IMPORTANT

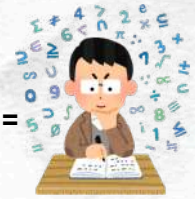
0 - 1 = X, so, you must borrow. When you borrow, you will get 2 (because the base is 2).

So, 2 - 1 = 1

borrow

	0 ~~1~~	2 0	1	
-		1	1	
	0	1	0	$_2$

Answer = 10 (base 2)



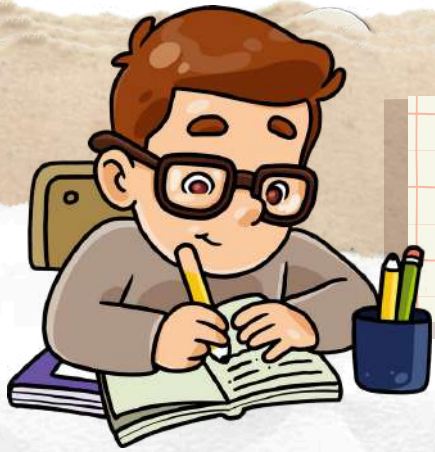
2) 11100111 - 10101101 =

SOLUTION:

borrow borrow borrow

	1	0 ~~1~~	2 ~~1~~	1 ~~0~~	2 ~~0~~	1	1	1	
-	1	0	1	0	1	1	0	1	
	0	0	1	1	1	0	1	0	$_2$

Answer = 111010 (base 2)



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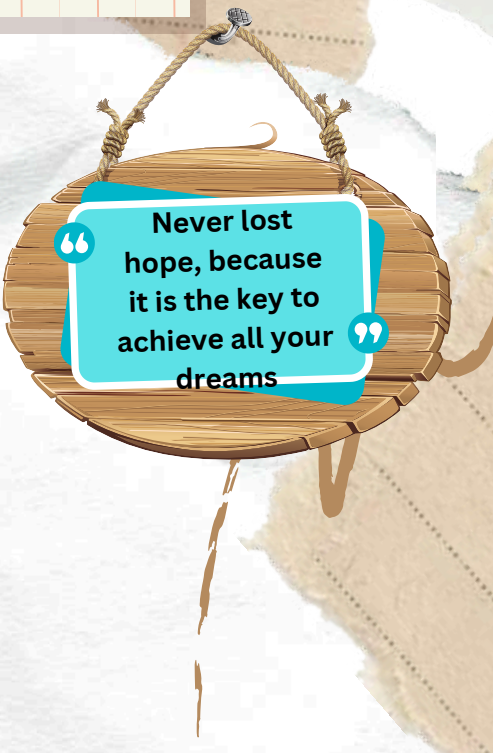


1

- Solve the following Binary numbers

a) 1010 + 1110

b) 1110 + 1001

c) 10111+1111

d) 1001.011 + 0100.110

e) 101-011

f) 1110 - 0011

g) 1100 - 0111

h) 10000 - 01111

SCAN ME!

OR

Check answers:
https://drive.google.com/file/d/1naBcVgfbr4RMO6iwDfm4-cYRkK9wm_KS/view?usp=drive_link

BINARY NUMBER - MULTIPLICATION

HELPFUL TIPS

Rules of Binary Multiplication

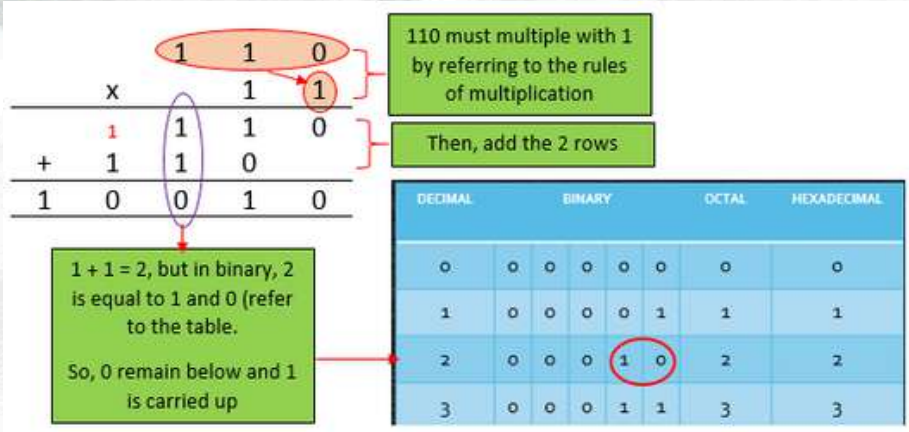
- 0 X 0 = 0
- 0 X 1 = 0
- 1 X 0 = 0
- 1 X 1 = 1, AND NO CARRY OR BORROW BITS

EXAMPLES :

Solve the following Binary numbers:

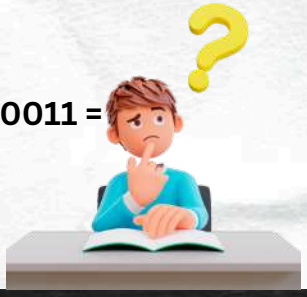
1) 110 x 11 =

SOLUTION:

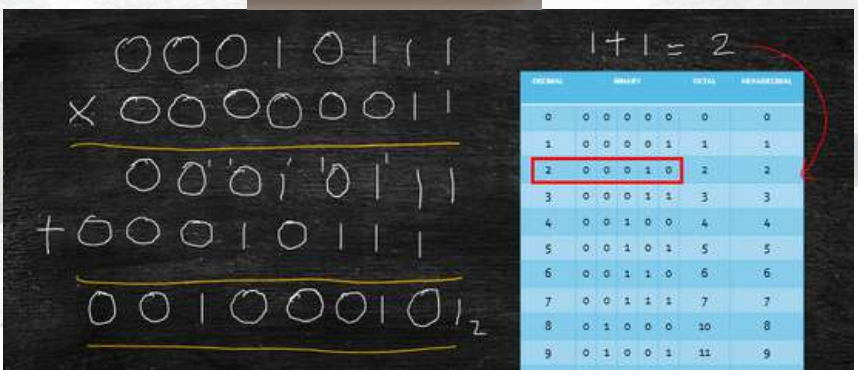


Answer = 10010 (base 2)

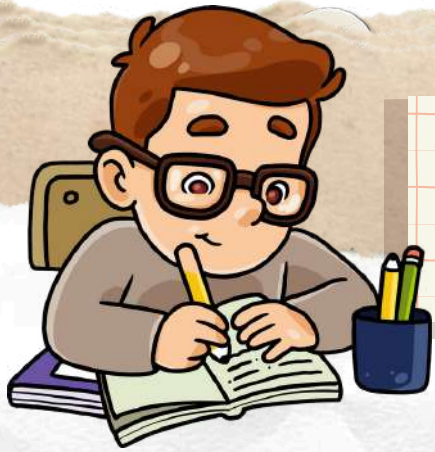
2) 00010111 x 00000011 =



SOLUTION:



Answer = 1000101 (base 2)



TRY THIS!

1 • **Solve the following <u>binary</u> numbers**

a) 110 x 101

b) 1011 x 10

c) 101 x 11

d) 1011 x 111

e) 101010 x 11

f) 101001 x 111

g) 111101 x 1011

h) 111111 x 1011

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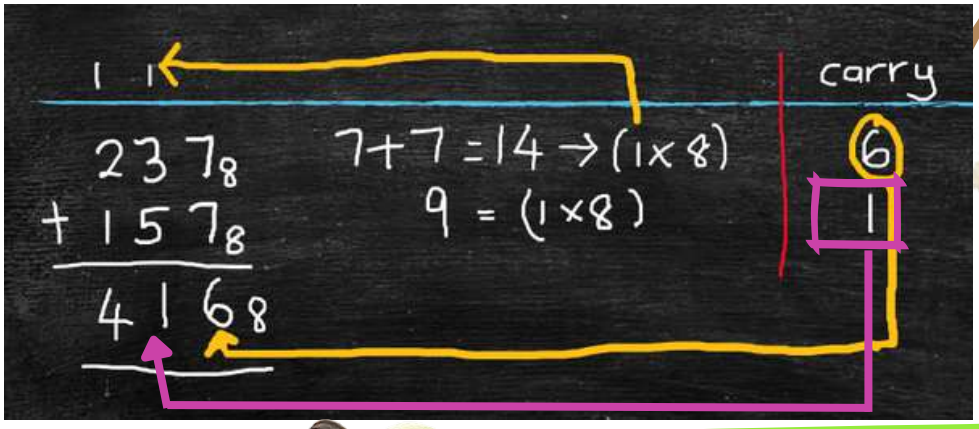
1.3.2 - ADDITION & SUBTRACTION IN OCTAL NUMBER

EXAMPLES :

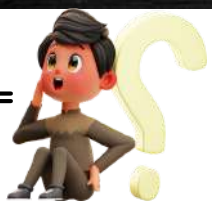
Solve the following Octal numbers:

1) 237 + 157 =

SOLUTION:

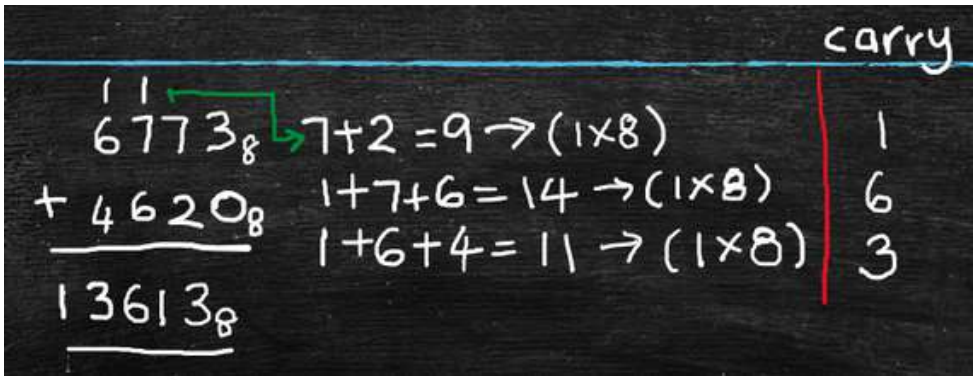


Answer = 416 (base 8)



2) 6773 + 4620 =

SOLUTION:

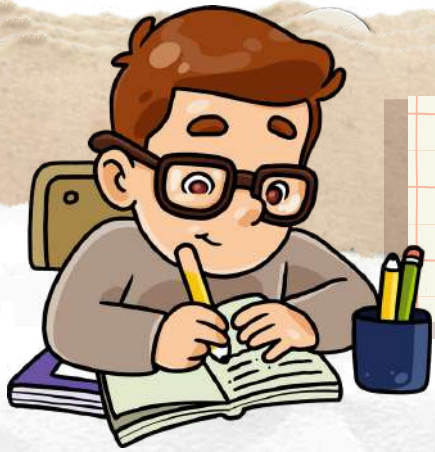


Answer = 13613 (base 8)

TIPS:

ADDED VALUE MUST<8 (BECAUSE THE BASE IS 8).

IF ADDED VALUE >8, THE VALUE MUST CARRY OUT



TRY THIS!

1

- **Solve the following <u>Octal</u> numbers**

a) 263+115

b) 266+331

c) 125+520

d) 777+123

e) 3451+222

SCAN ME!

OR

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https://drive.google.com/file/d/1ewG-pY77jM2svgjsOl0R1BifpOiHGJBG/view?usp=drive_link

SUBTRACTION IN OCTAL NUMBER

EXAMPLE : Solve the following Octal numbers:

1) 321 - 15 =

SOLUTION:

1

- (1 - 5) is not enough to subtract.
- Had to borrow from number 2
- Because the base is 8, so, 8 + 1 = 9, then 9 - 5 = 4

2

- Second step, (1 - 1) = 0

3

- Third step, (3 - 0) = 3

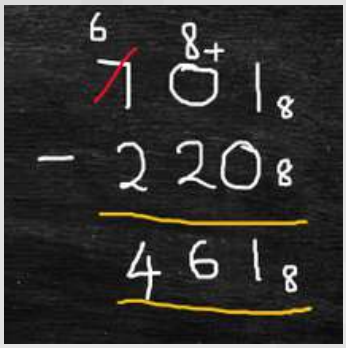
so, the answer is..... 304

SUBTRACTION IN OCTAL NUMBER

EXAMPLES: Solve the following Octal numbers:

701 - 220 =

SOLUTION:



Answer = 461 (base 8)

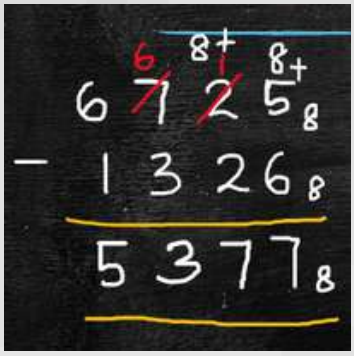
3503 - 1153 =

SOLUTION:

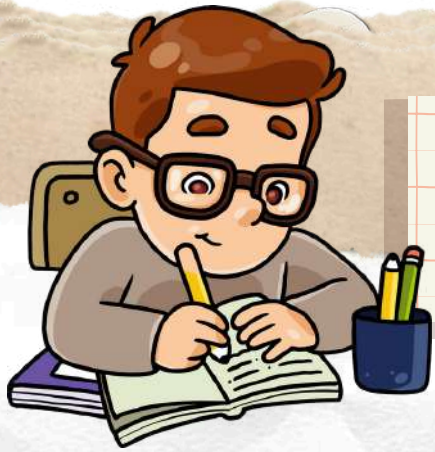
Answer = 2330 (base 8)

3503 - 1153 =

SOLUTION:



Answer = 5377 (base 8)



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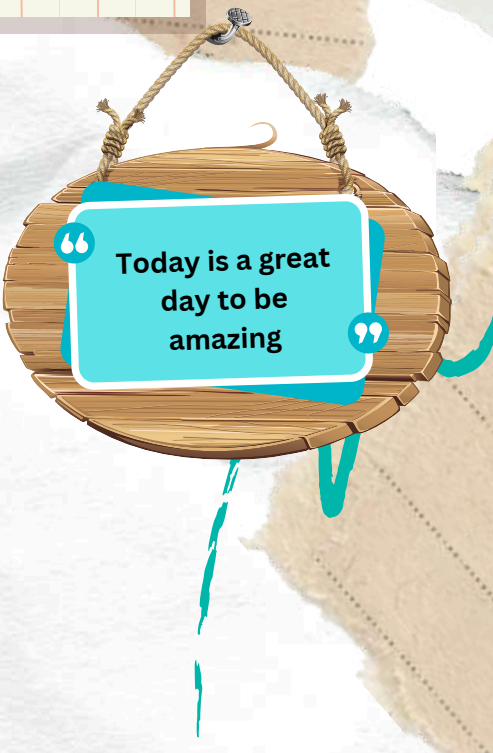

1

- Solve the following <u>Octal</u> numbers

a) 443 - 25

b)765 - 276

c) 370 - 135

d) 2117 - 352

e) 505 - 46

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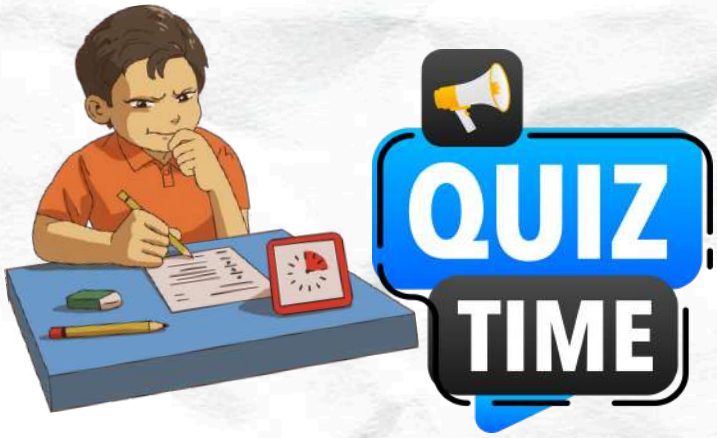
Check answers:

https://drive.google.com/file/d/1EzIbbAjyAaN1YGqXtB6qDlu-07AngsjK/view?usp=sharing



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Click here

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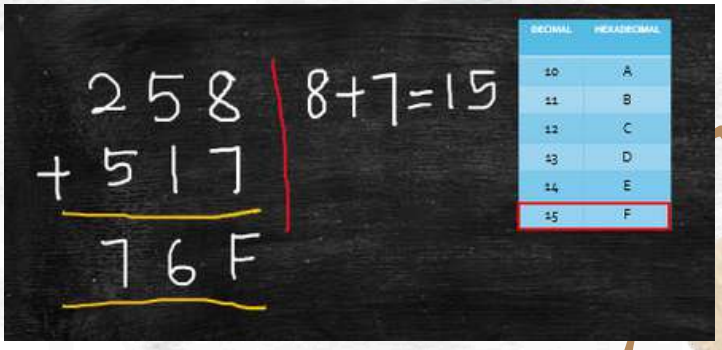
1.3.3 - ADDITION & SUBTRACTION IN HEXADECIMAL NUMBER

EXAMPLES:

Solve the following Hexadecimal numbers:

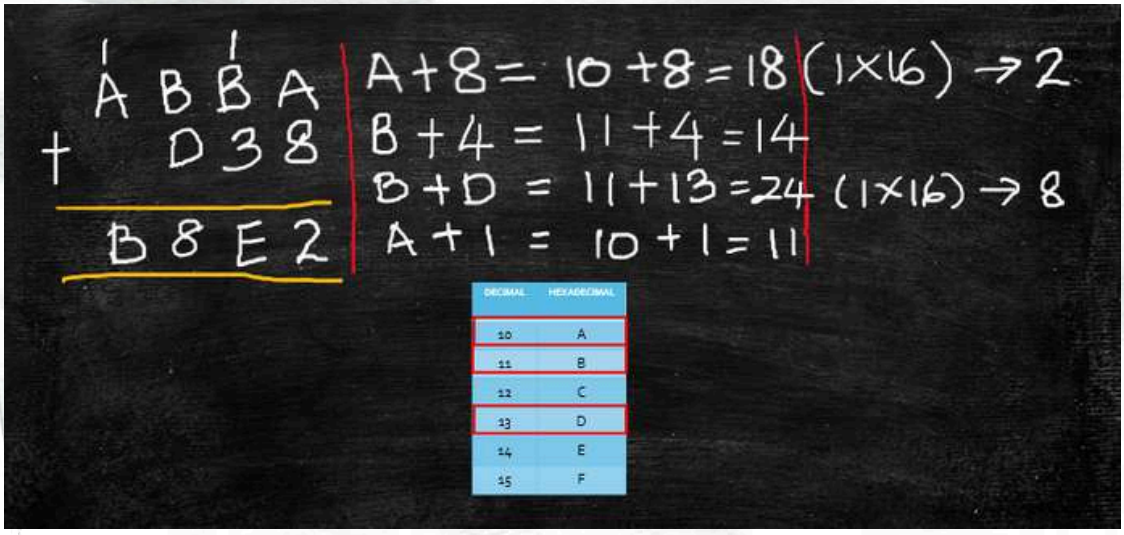
1) 258 + 517 = ???

SOLUTION:



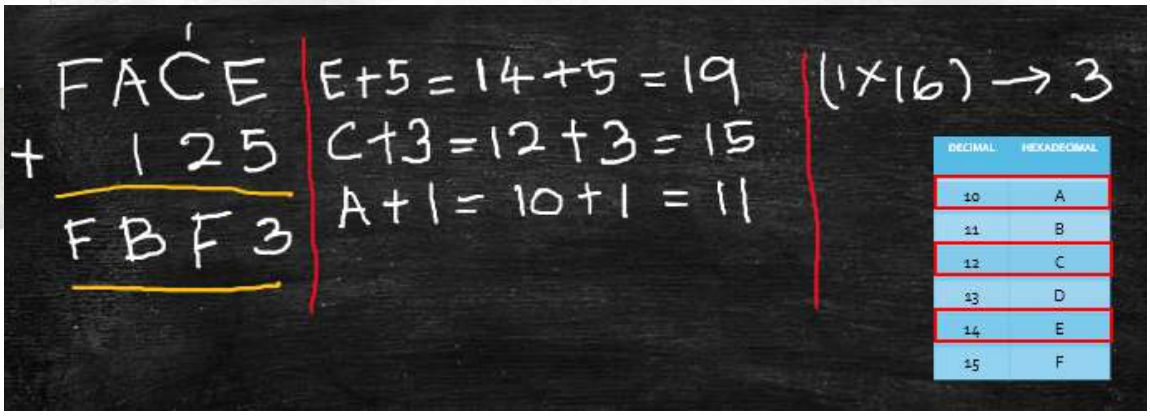
2) ABBA + D38 = ???

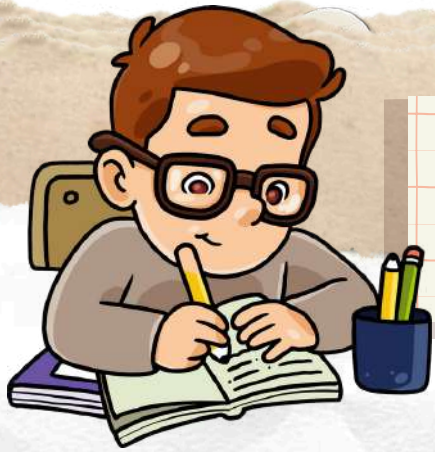
SOLUTION:



3) FACE + 125 = ???

SOLUTION:





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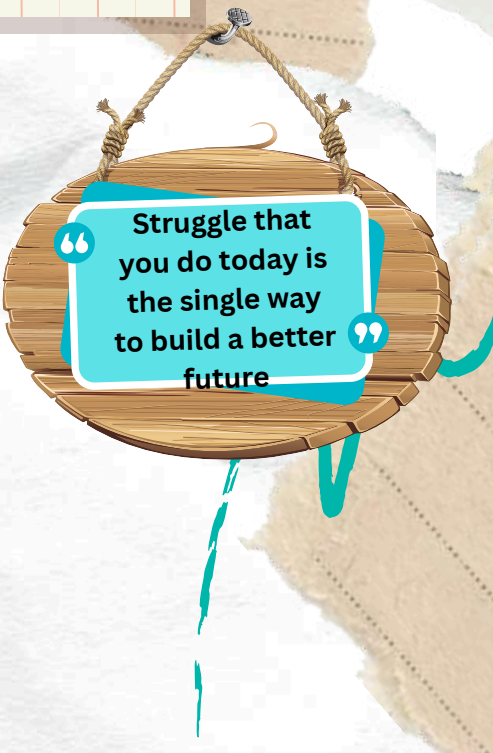


1. Solve the following <u>Hexadecimal</u> numbers

a) 2A + F9

b)BA + 15

c) C5 + FB

d) 2D11 + 30A1

e) CAD0 + EA6F

SCAN ME!

OR

Check answers:

https://drive.google.com/file/d/1NPA8RN1N7tRfYfNVwJmjoWfIVV-9P5wH/view?usp=drive_link

SUBTRACTION IN HEXADECIMAL NUMBER

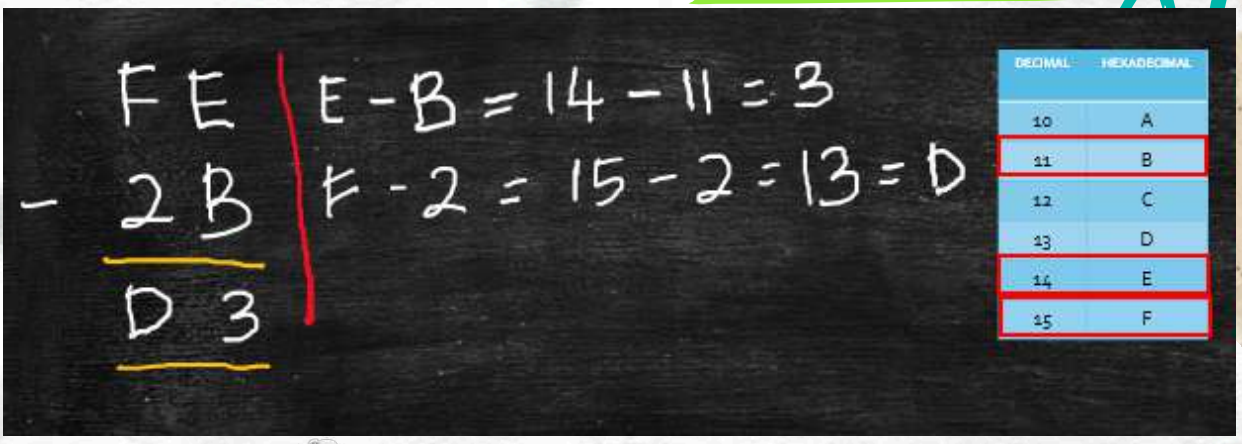
EXAMPLES

Solve the following Hexadecimal numbers:

1) FE - 2B =

SOLUTION:

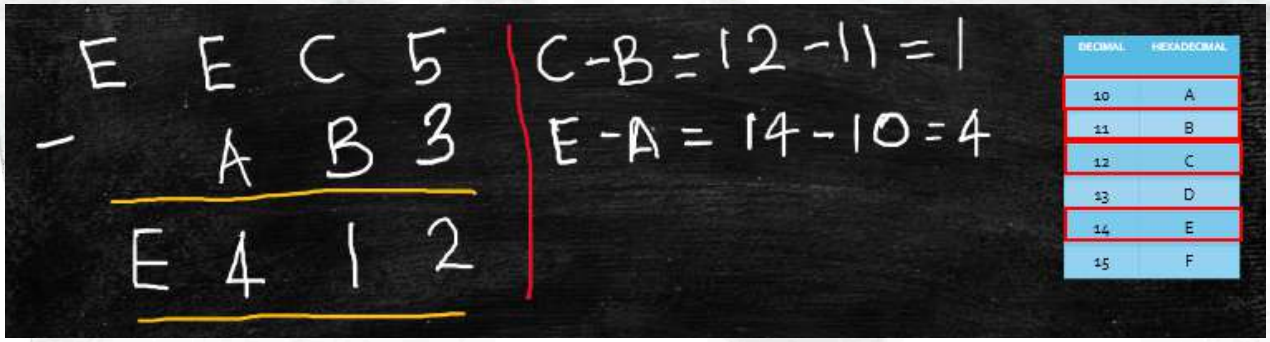
Answer = D3 (base 16)



2) EEC5 - AB3 =

SOLUTION:

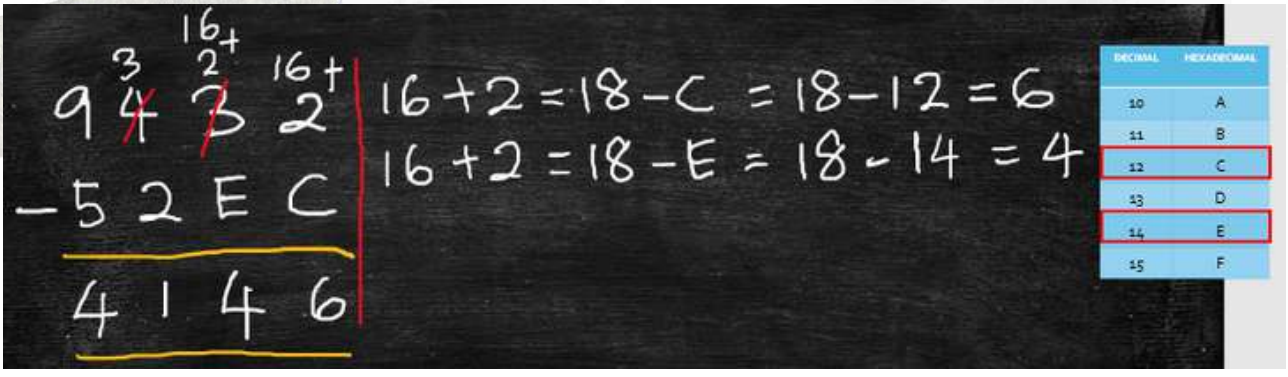
Answer = E412 (base 16)

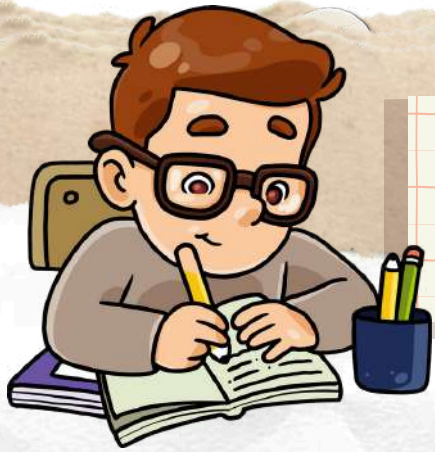


3) 9432 - 52EC =

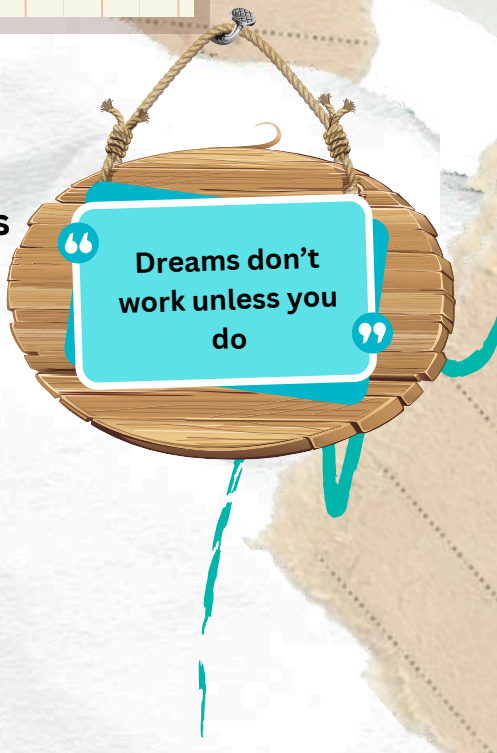
SOLUTION:

Answer = 4146 (base 16)





TRY THIS!



1. • Solve the following Hexadecimal numbers

a) CB - 72

b) 93F - 45F

c) F521 - 600

d) DDF8 - EC9

e) FAEF - 1DE

OR

Check answers:

https://drive.google.com/file/d/158t0Nn8j8n2tuBVDZurg8YPUGvsScr26/view?usp=drive_link

SCAN ME!

1.3.4 CONVERTING NUMBER SYSTEM
BINARY TO DECIMAL

EXAMPLES CONVERT BINARY TO DECIMAL NUMBERS:

1) 1110 (base 2) = _____(decimal)

SOLUTION:

1	1	1	0
2^3	2^2	2^1	2^0

$= (1x2^3) + (1x2^2) + (1x2^1) + (0x2^0)$

$= 8 + 4 + 2 + 0$

$= \underline{14_{10}}$

2) 111010 (base 2) = _____(decimal)

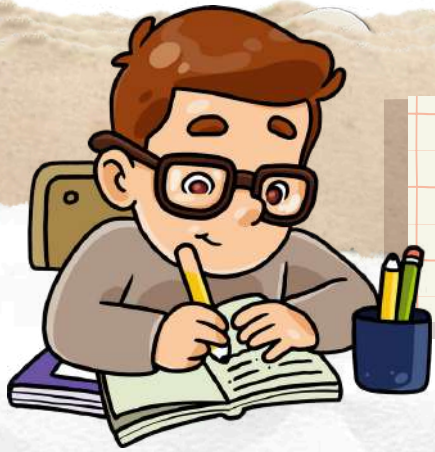
SOLUTION:

1	1	1	0	1	0
2^5	2^4	2^3	2^2	2^1	2^0

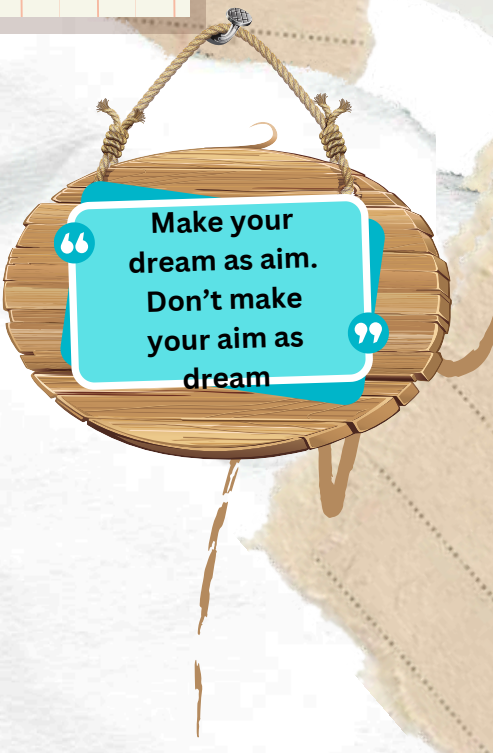
$= (1x2^5) + (1x2^4) + (1x2^3) + (0x2^2) + (1x2^1) + (0x2^0)$

$= 32 + 16 + 8 + 2$

$= 58$



TRY THIS!



1. • Convert <u>Binary to Decimal</u> Number

a) 11001

b)1010111

c) 1011100

d) 1110011

e) 10001111

SCAN ME!

OR

Check answers:

https://drive.google.com/file/d/1cMFIJ9NaOup-nPfnvJnNvTrNgmU5RxpF/view?usp=drive_link

1.3.5 CONVERTING NUMBER SYSTEM
OCTAL TO DECIMAL

EXAMPLES

CONVERT OCTAL TO DECIMAL NUMBERS:

1) 11230 (base 8) = _____(decimal)

SOLUTION:

1	2	3	0
8^3	8^2	8^1	8^0

$= (1x8^3) + (2x8^2) + (3x8^1) + (0x8^0)$

$= 512 + 128 + 24 + 0$

$= \underline{664_{10}}$

2) 5217 (base 8) = _____(decimal)

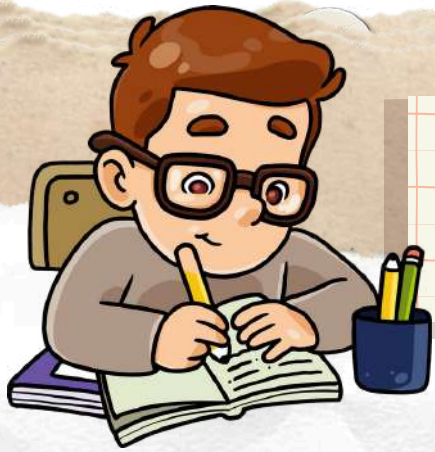
SOLUTION:

5	2	1	7
8^3	8^2	8^1	8^0

$= (5x8^3) + (2x8^2) + (1x8^1) + (7x8^0)$

$= 2560 + 128 + 8 + 7$

$= 2703_{10}$



TRY THIS!

1. • Convert <u>Octal to Decimal</u> Number

a) 225

b) 635

c) 6733

d) 5015

e) 1141

SCAN ME!

OR

Check answers:

https://drive.google.com/file/d/1qOaN7Wxaun81yGG7A4lNDu93b63dpwal/view?usp=drive_link

1.3.6 CONVERTING NUMBER SYSTEM HEXADECIMAL TO DECIMAL

EXAMPLES

CONVERT HEXADECIMAL TO DECIMAL NUMBERS:

1) E9 (base 16) = _____(decimal)

SOLUTION:

E	9
16^1	16^0

$= (E \times 16^1) + (9 \times 16^0)$

$= 224 + 9$

$= \underline{\underline{233_{10}}}$

2) 5217 (base 16) = _____(decimal)

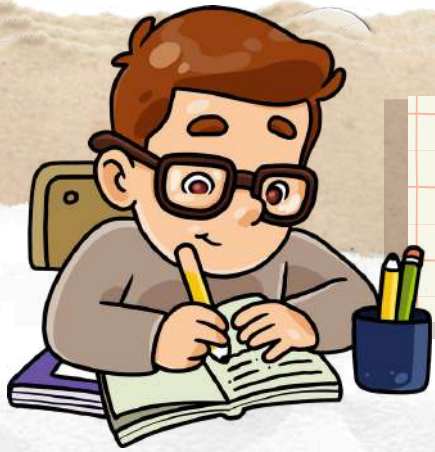
SOLUTION:

5	2	1	7
8^3	8^2	8^1	8^0

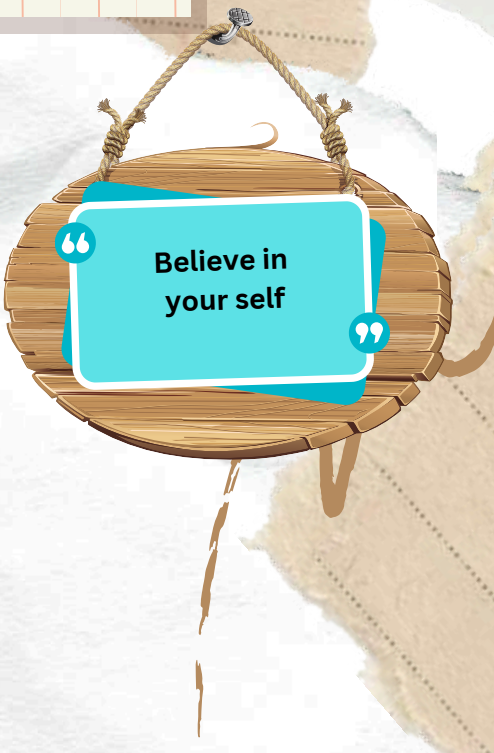
$= (5 \times 8^3) + (2 \times 8^2) + (1 \times 8^1) + (7 \times 8^0)$

$= 2560 + 128 + 8 + 7$

$= \underline{2703_{10}}$



TRY THIS!



1. Convert <u>Hexadecimal to Decimal</u> Number

a) 1EF

b) 55DC

c) A2F

d) 11C

e) 39B

SCAN ME!

OR

Check answers:

https://drive.google.com/file/d/1R7eKzNrXMS0Y_cj-EgWSG0sfwDAUYsM5/view?usp=drive_link

1.3.7 CONVERTING NUMBER SYSTEM
DECIMAL TO BINARY

EXAMPLES

CONVERT DECIMAL TO BINARY NUMBERS:

1) 25 (base 10) = _____(base 2)

SOLUTION:

2	25_{10}	
2	12_{10}	0.5 x 2 = 1
2	6_{10}	= 0
2	3_{10}	= 0
2	1_{10}	0.5 x 2 = 1
	0_{10}	0.5 x 2 = 1

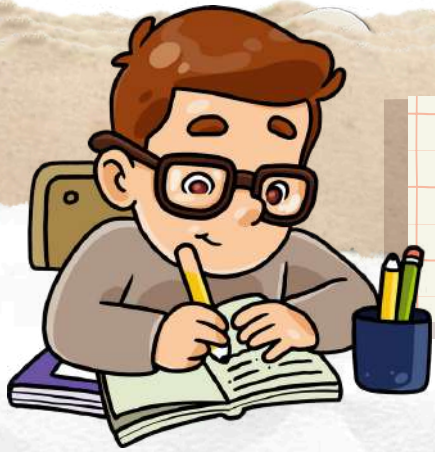
$25_{10} = 11001_{2}$

2) 512 (base 10) = _____(base 2)

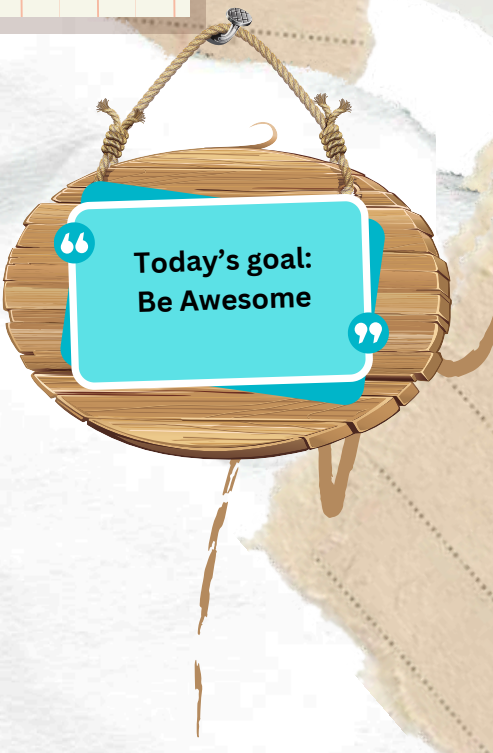
SOLUTION:

2	512_{10}	
2	256_{10}	= 0
2	128_{10}	= 0
2	64_{10}	= 0
2	32_{10}	= 0
2	16_{10}	= 0
2	8_{10}	= 0
2	4_{10}	= 0
2	2_{10}	= 0
2	1_{10}	= 0
	0_{10}	0.5 x 2 = 1

$512_{10} = 1000000000_{2}$



TRY THIS!



1

- Convert Decimal to Binary Number

a) 13

b) 69

c) 55

d) 113

e) 765

SCAN ME!

OR

Check answers:

https://drive.google.com/file/d/1sethQR7sQ_wU3RHJmOlmF8Y5v4ieuADJ/view?usp=drive_link

1.3.8 CONVERTING NUMBER SYSTEM DECIMAL TO OCTAL

EXAMPLES

CONVERT DECIMAL TO OCTAL NUMBERS:

1) 121 (base 10) = _____(base 8)

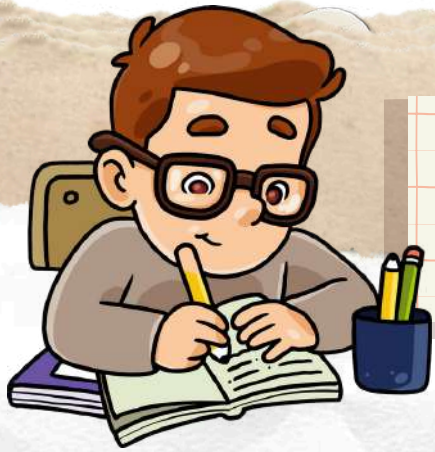
SOLUTION:

8 | 121_{10}		$121_{10} = 171_8$
8 | 15_{10}	0.125x 8 = 1	
8 | 1_{10}	0.875 x 8 = 7	
0_{10}	0.125 x 8 = 1	

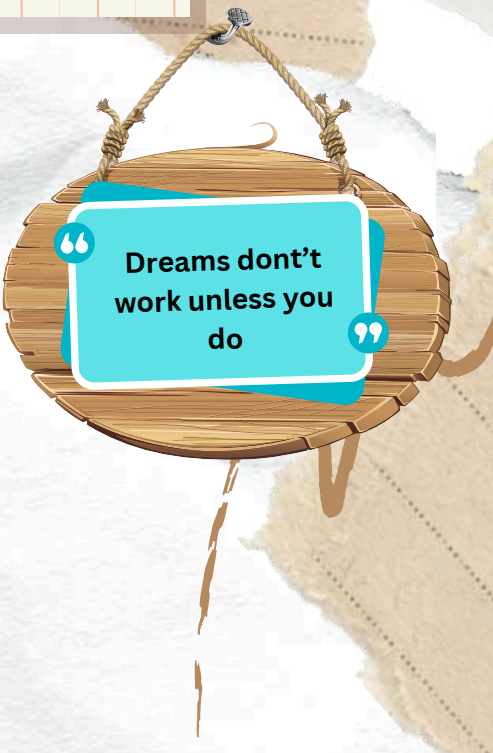
2) 1151 (base 10) = _____(base 8)

SOLUTION:

8 | 1151_{10}		$1151 = 2177_8$
8 | 143_{10}	0.875 x 8 = 7	
8 | 17_{10}	0.875 x 8 = 7	
8 | 2_{10}	0.125 x 8 = 1	
8 | 0_{10}	0.25 x 8 = 2	



TRY THIS!



1. • Convert <u>Decimal to Octal</u> Number

a) 27

b) 89

c) 987

d) 521

e) 4135

SCAN ME!

OR

Check answers:

<u>https://drive.google.com/file/d/1Tj8Qk4XtdX4s9UGsqmHB7h74eOsBFTAP/view?usp=drive_link</u>

1.3.9 CONVERTING NUMBER SYSTEM DECIMAL TO HEXADECIMAL

EXAMPLES

CONVERT 28 (BASE 10) TO HEXADECIMAL NUMBER (BASE 16)

1) 28 (base 10) = _____(base 16)

SOLUTION:

16	28_{10}	
16	1_{10}	0.75x 16 = 12 = C
	0_{10}	0.0625 x 16 = 1

$28_{10} = 1C_{16}$

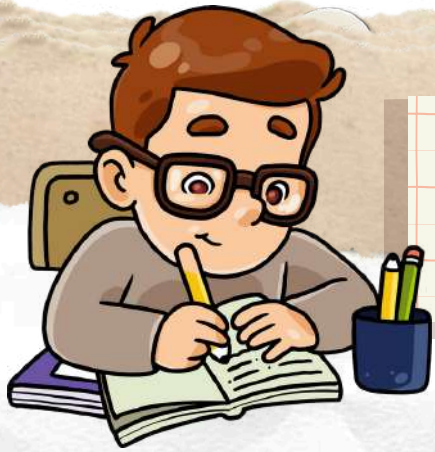
10	0	1	0	1	0	12	A
11	0	1	0	1	1	13	B
12	0	1	1	0	0	14	C
13	0	1	1	0	1	15	D
14	0	1	1	1	0	16	E
15	0	1	1	1	1	17	F

2) 911 (base 10) = _____(base 16)

SOLUTION:

16	911_{10}	
16	56_{10}	0.9375 x 16 = 15 = E
16	3_{10}	0. 5 x 16 = 8
	0_{10}	0.1875 x 16 = 3

$911_{10} = 38E_{16}$



TRY THIS!

1. • Convert Decimal to Hexadecimal Number

a) 60

b) 369

c) 485

d) 947

e) 1277

SCAN ME!

OR

Check answers:

https://drive.google.com/file/d/1r-oTSiHjeXq2593OsTbvWuPCSGeI2iWF/view?usp=drive_link

1.3.10 CONVERTING NUMBER SYSTEM
OCTAL TO BINARY

EXAMPLES

1) 54 (base 8) = _____(base 2)

SOLUTION:

Refer to the Table to get the answer

5	4
101	100

So, $54_8 = \underline{101100}_2$

DECIMAL	BINARY					OCTAL
0	0	0	0	0	0	0
1	0	0	0	0	1	1
2	0	0	0	1	0	2
3	0	0	0	1	1	3
4	0	0	1	0	0	4
5	0	0	1	0	1	5
6	0	0	1	1	0	6
7	0	0	1	1	1	7

2) 721 (base 8) = _____(base 2)

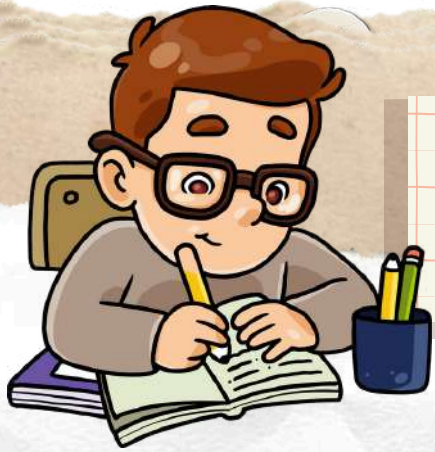
SOLUTION:

Refer to the Table to get the answer

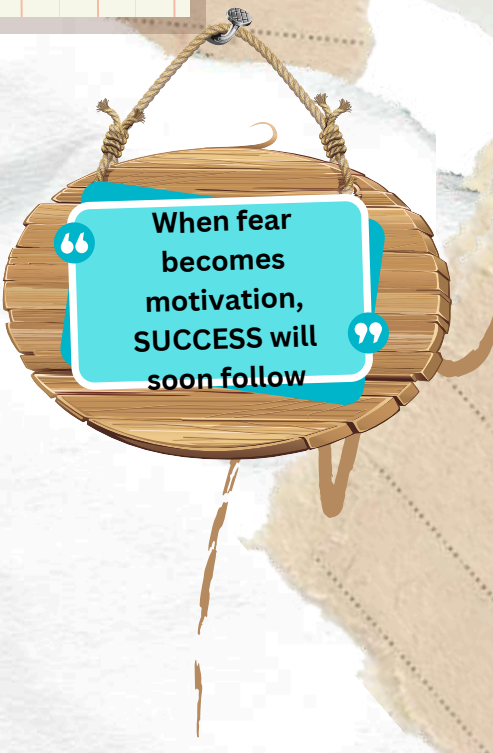
7	2	1
111	010	001

So, $721_8 = \underline{111010001}_2$

DECIMAL	BINARY					OCTAL
0	0	0	0	0	0	0
1	0	0	0	0	1	1
2	0	0	0	1	0	2
3	0	0	0	1	1	3
4	0	0	1	0	0	4
5	0	0	1	0	1	5
6	0	0	1	1	0	6
7	0	0	1	1	1	7



TRY THIS!



1

- Convert <u>Octal to Binary</u> Number

a) 36

b) 261

c) 105

d) 1133

e) 3470

OR

Check answers:

SCAN ME!

https://drive.google.com/file/d/1ErInlZ9Z4PScB8LjpWHyYQWKmriS80Le/view?usp=drive_link

1.3.11 CONVERTING NUMBER SYSTEM

HEXADECIMAL TO BINARY

EXAMPLES

1) 5F (base 16) = _____(base 2)

SOLUTION:

Refer to the Table to get the answer

5	F
0101	1111

So, $5F_{16} = \underline{1011111_2}$

DECIMAL	BINARY				HEXADECIMAL
1	0	0	0	1	1
2	0	0	1	0	2
3	0	0	1	1	3
4	0	1	0	0	4
5	0	1	0	1	5
6	0	1	1	0	6
7	0	1	1	1	7
8	1	0	0	0	8
9	1	0	0	1	9
10	1	0	1	0	A
11	1	0	1	1	B
12	1	1	0	0	C
13	1	1	0	1	D
14	1	1	1	0	E
15	1	1	1	1	F

2) 3C2 (base 16) = _____(base 2)

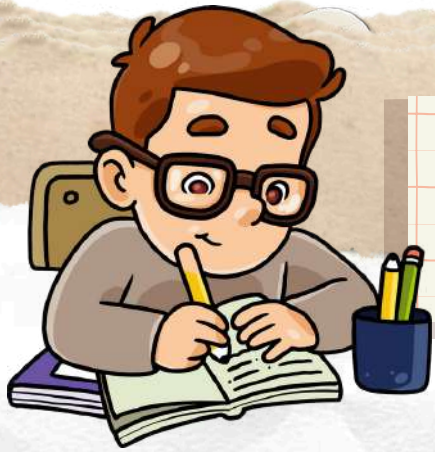
SOLUTION:

Refer to the Table to get the answer

3	C	2
0011	1100	0010

So, $3C2_{16} = \underline{1111000010_2}$

DECIMAL	BINARY				HEXADECIMAL
1	0	0	0	1	1
2	0	0	1	0	2
3	0	0	1	1	3
4	0	1	0	0	4
5	0	1	0	1	5
6	0	1	1	0	6
7	0	1	1	1	7
8	1	0	0	0	8
9	1	0	0	1	9
10	1	0	1	0	A
11	1	0	1	1	B
12	1	1	0	0	C



TRY THIS!

1

- **Convert Hexadecimal to Binary Number**

a) 2B

b) 51A

c) CCA

d) BAC1

e) 20FE

SCAN ME!

OR

Check answers:

https://drive.google.com/file/d/1V8otyHEhrCqgNPU-lzjpotFDR1bqhY8I/view?usp=drive_link

1.3.12 CONVERTING NUMBER SYSTEM
BINARY TO OCTAL

EXAMPLES

1) 111011 (base 2) = _____(base 8)

SOLUTION:

Refer to the Table to get the answer

111	011
7	3

So, $111011_2 = 73_8$

DECIMAL	BINARY					OCTAL
0	0	0	0	0	0	0
1	0	0	0	0	1	1
2	0	0	0	1	0	2
3	0	0	0	1	1	3
4	0	0	1	0	0	4
5	0	0	1	0	1	5
6	0	0	1	1	0	6
7	0	0	1	1	1	7

2) 101110101 (base 2) = _____(base 8)

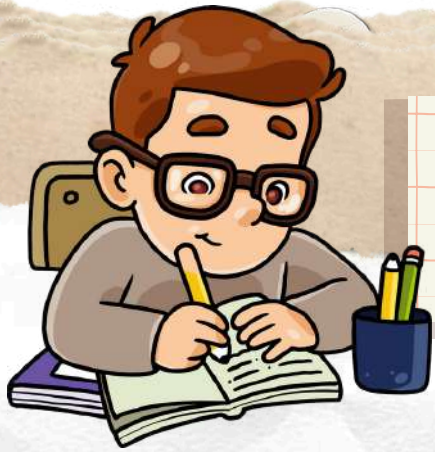
SOLUTION:

Refer to the Table to get the answer

101	110	101
5	6	5

So, $101110101_2 = 565_8$

DECIMAL	BINARY					OCTAL
0	0	0	0	0	0	0
1	0	0	0	0	1	1
2	0	0	0	1	0	2
3	0	0	0	1	1	3
4	0	0	1	0	0	4
5	0	0	1	0	1	5
6	0	0	1	1	0	6
7	0	0	1	1	1	7



TRY THIS!

1. • Convert Binary to Octal Number

a) 10100

b) 110011

c) 1111100

d) 10100101111

e) 111000010101

OR

Check answers:

https://drive.google.com/file/d/1bZCuROv6e22Pe23us2Vyk-wsM2acGut_/view?usp=drive_link

SCAN ME!

1.3.13 CONVERTING NUMBER SYSTEM
BINARY TO HEXADECIMAL

EXAMPLES

1) 111010 (base 2) = _____(base 16)

SOLUTION:

Refer to the Table
to get the answer

11	1010
3	A

So, $111010_2 = 3A_{16}$

DECIMAL	BINARY				HEXADECIMAL
1	0	0	0	1	1
2	0	0	1	0	2
3	0	0	1	1	3
4	0	1	0	0	4
5	0	1	0	1	5
6	0	1	1	0	6
7	0	1	1	1	7
8	1	0	0	0	8
9	1	0	0	1	9
10	1	0	1	0	A
11	1	0	1	1	B
12	1	1	0	0	C

2) 111000000011 (base 2) = _____(base 16)

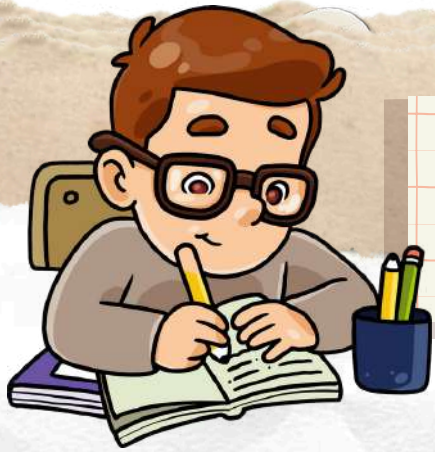
SOLUTION:

Refer to the Table
to get the answer

1110	0000	0011
E	0	3

So, $111000000011_2 = E03_{16}$

DECIMAL	BINARY				HEXADECIMAL
1	0	0	0	1	1
2	0	0	1	0	2
3	0	0	1	1	3
4	0	1	0	0	4
5	0	1	0	1	5
6	0	1	1	0	6
7	0	1	1	1	7
8	1	0	0	0	8
9	1	0	0	1	9
10	1	0	1	0	A
11	1	0	1	1	B
12	1	1	0	0	C
13	1	1	0	1	D
14	1	1	1	0	E
15	1	1	1	1	F



TRY THIS!

1. • Convert <u>Binary to Hexadecimal</u> Number

a) 10100

b) 10101000

c) 110110111001

d)101101110101111

e) 1011110000000101

SCAN ME!

OR

Check answers:

https://drive.google.com/file/d/1mj2r4MUT6-tc5JhjzOJnQMmaKQ5Ohj5B/view?usp=drive_link

1.3.14 CONVERTING NUMBER SYSTEM
OCTAL TO HEXADECIMAL

EXAMPLES

1) 157 (base 8) = _____(base 16)

SOLUTION:

Refer to the Table to get the answer

5	7	OCTAL
101	111	BINARY
Tips: Hexadecimal must be in 4 bits		
10	1111	HEXADECIMAL

So, $57_8 = 2F_{16}$

DECIMAL	BINARY				HEXADECIMAL
1	0	0	0	1	1
2	0	0	1	0	2
3	0	0	1	1	3
4	0	1	0	0	4
5	0	1	0	1	5
6	0	1	1	0	6
7	0	1	1	1	7
8	1	0	0	0	8
9	1	0	0	1	9
10	1	0	1	0	A
11	1	0	1	1	B
12	1	1	0	0	C
13	1	1	0	1	D
14	1	1	1	0	E
15	1	1	1	1	F

2) 20 (base 8) = _____(base 16)

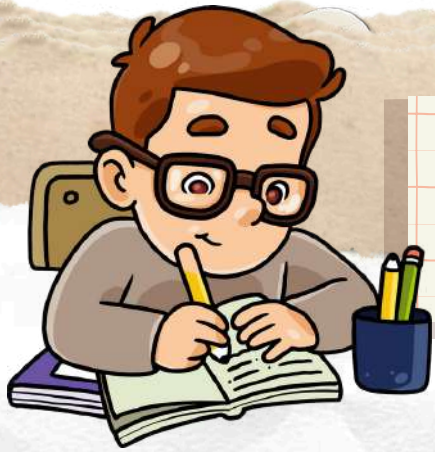
SOLUTION:

Refer to the Table to get the answer

2	0	OCTAL
010	000	BINARY
Tips: Hexadecimal must be in 4 bits		
01	0000	HEXADECIMAL

So, $20_8 = 10_{16}$

DECIMAL	BINARY				HEXADECIMAL
1	0	0	0	1	1
2	0	0	1	0	2
3	0	0	1	1	3
4	0	1	0	0	4
5	0	1	0	1	5
6	0	1	1	0	6



TRY THIS!

1. • Convert Octal to Hexadecimal Number

a) 54

b) 233

c) 505

d) 1277

e) 3115

SCAN ME!

OR

Check answers:

https://drive.google.com/file/d/1krxyRdvn9FMTGt1RCL12gn93b2XTD7Nj/view?usp=drive_link

1.3.15 CONVERTING NUMBER SYSTEM HEXADECIMAL TO OCTAL

EXAMPLES

1) 5E (base 16) = _____(base 8)

SOLUTION:

Refer to the Table to get the answer

5	E		HEXADECIMAL
0101	1110		BINARY
Tips: The bit for Octal must be in 3 bits			
01	011	110	OCTAL
1	3	6	answer

So, $5E_{16} = 136_8$

DECIMAL	BINARY				HEXADECIMAL
1	0	0	0	1	1
2	0	0	1	0	2
3	0	0	1	1	3
4	0	1	0	0	4
5	0	1	0	1	5
6	0	1	1	0	6
7	0	1	1	1	7
8	1	0	0	0	8
9	1	0	0	1	9
10	1	0	1	0	A
11	1	0	1	1	B
12	1	1	0	0	C
13	1	1	0	1	D
14	1	1	1	0	E
15	1	1	1	1	F

2) 61D (base 16) = _____(base 8)

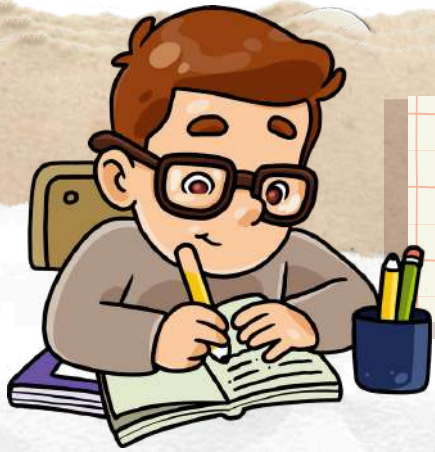
SOLUTION:

Refer to the Table to get the answer

	6	1	D	HEXADECIMAL
	0110	0001	1101	BINARY
Tips: The bit for Octal must be in 3 bits				
011	000	011	101	OCTAL
3	0	3	5	answer

So, $61D_{16} = 3035_8$

DECIMAL	BINARY				HEXADECIMAL
1	0	0	0	1	1
2	0	0	1	0	2
3	0	0	1	1	3
4	0	1	0	0	4
5	0	1	0	1	5
6	0	1	1	0	6
7	0	1	1	1	7
8	1	0	0	0	8
9	1	0	0	1	9
10	1	0	1	0	A
11	1	0	1	1	B
12	1	1	0	0	C
13	1	1	0	1	D
14	1	1	1	0	E
15	1	1	1	1	F



TRY THIS!

1. • Convert <u>Hexadecimal to Octal</u> Number

a) F3

b) 2AB

c) 9DE

d) 12C

e) 420A

SCAN ME!

OR

Check answers:

https://drive.google.com/file/d/1hFDAhS4dSp-U3Ux2NyvRT1hoNa6jIPDg/view?usp=drive_link

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02

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04

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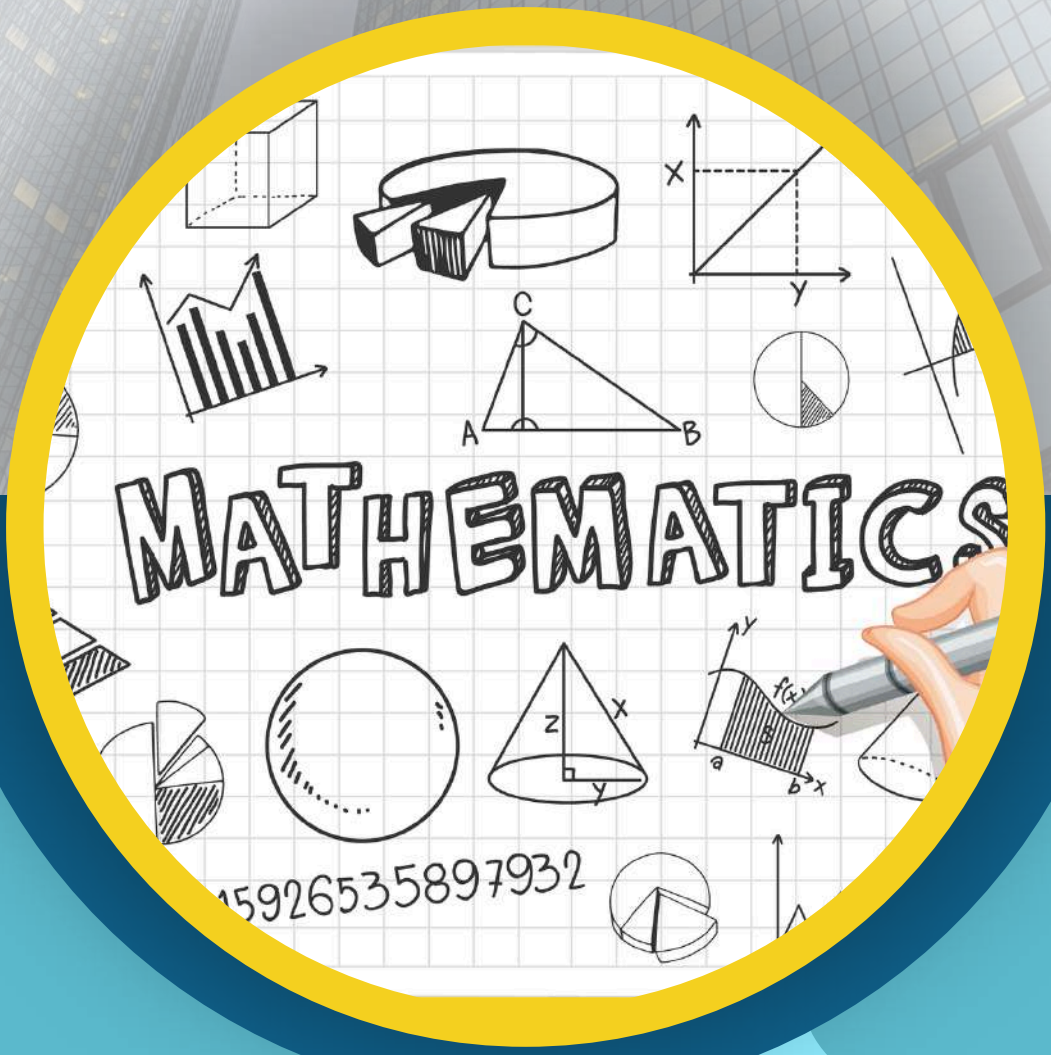

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