

binary \rightarrow decimal

1) 1011

$$1 \times 2^3 = 8$$

$$0 \times 2^2 = 0$$

$$1 \times 2^1 = 2$$

$$1 \times 2^0 = 1$$

$$= 11$$

2) $37_8 \rightarrow$ decimal

$$8^1 \times 3 = 24$$

$$8^0 \times 7 = 7$$

$$= 31$$

c) $1F \rightarrow 111$

$$16^1 \times 1 \rightarrow 16$$

$$16^0 \times 15 \rightarrow 15$$

$$= 31$$

Convert binary

a) $25 \rightarrow$ binary

$$25 \div 2 = 12 \text{ R } 1$$

$$12 \div 2 = 6 \text{ R } 0$$

$$6 \div 2 = 3 \text{ R } 0 \quad = 11001$$

$$3 \div 2 = 1 \text{ R } 1$$

$$1 \div 2 = 0 \text{ R } 1$$

b) 7E

7 and 14

\rightarrow convert each to 1 bit binary

$$7 \div 2 = 3 \text{ R } 1$$

$$3 \div 2 = 1 \text{ R } 1$$

$$1 \div 2 = 0 \text{ R } 1$$

$$0$$

$$14 \div 2 = 7 \text{ R } 0$$

$$7 \div 2 = 3 \text{ R } 1$$

$$3 \div 2 = 1 \text{ R } 1$$

$$1 \div 2 = 0 \text{ R } 1$$

01111110

a) $1101010 \rightarrow \text{octal}$

001 101 010

$$0 \times 2^2 = 0 \quad 1 \times 2^2 = 4$$

$$0 \times 2^2 = 0$$

$$1 + 5 + 2$$

$$0 \times 2^1 = 0 \quad 0 \times 2^1 = 0$$

$$1 \times 2^1 = 2$$

$$= 152$$

$$1 \times 2^0 = 1 \quad 1 \times 2^0 = 1$$

$$0 \times 2^0 = 0$$

$$= 2$$

$$= 1 \quad = 5$$

b) $100 \rightarrow \text{octal}$

$$100 \div 8 = 12 \text{ R } 4$$

$$12 \div 8 = 1 \text{ R } 4 \quad = 144_8$$

$$1 \div 8 = 0 \text{ R } 1$$

c) $2A \rightarrow \text{octal}$

\rightarrow convert hex \rightarrow binary \rightarrow octal

$$2 \div 2 = 1 \text{ R } 0$$

$$A \rightarrow 10$$

$$10 \div 2 = 5 \text{ R } 0$$

$$1 \div 2 = 0 \text{ R } 1$$

$$0$$

$$5 \div 2 = 2 \text{ R } 1$$

$$0$$

$$2 \div 2 = 1 \text{ R } 0$$

$$0$$

$$1 \div 2 = 0 \text{ R } 1$$

00101010

Now group in 3's from right

000 101 010

$$0 \times 2^2 = 0 \quad 1 \times 2^2 = 4 \quad 0 \times 2^2 = 0$$

$$0 \times 2^1 = 0 \quad 0 \times 2^1 = 0 \quad 2 \times 2^1 = 2$$

$$0 \times 2^0 = 0 \quad 1 \times 2^0 = 1 \quad 0 \times 2^0 = 0$$

$$= 0 \quad = 1 = 5 \quad = 2$$

$= 52$

base \rightarrow decimal (multiply)
decimal \rightarrow base (divide)