Abdulla Aljunibi

ALGEBRA

the displacement, velocity and time can be expressed in the following formula:

Displacement = Velocity × Time

LINEAR EQUATIONS

$2x + 3 = 9$

$2x + 3 - 3 = 9 - 3$

$\frac{2x}{2} = \frac{6}{2}$

$x = 3$

$3w - 1 = 14$

$\frac{3w}{3} = \frac{15}{3}$

$w = 5$

$\frac{4x}{2} = 8(2)$

$4x = 8 \times 2$

$\frac{4x}{4} = \frac{16}{4}$

$x = 4$

$\frac{2x}{3} = 6$

$\frac{2}{3}x = 6(3)$

$\frac{2}{2}x = \frac{18}{2}$

$x = 9$

QUADRATIC EQUATIONS

$x^2 - 2x - 15$

$(x-5)(x+3)$

$x = 5 \quad x = -3$

$x^2 + 5x + 6$

$(x+2)(x+3)$

$x = -2 \quad x = -3$

$x^2 - 2x - 8$

$(x-4)(x+2)$

$x = 4, \; x = -2$

$x^2 - 2x - 15$

$5 + 3 = 5$

$5 - 3 = 2$

$(x-5)(x+3)$

$x - 5 = 0 \qquad x - 3 = 0$

$x = 5 \qquad x = 2$

$x^2 + 5x + 6$

$(x+2)(x+3)$

$x + 2 = 0 \qquad x + 3 = 0$

$x = -2 \qquad x = -3$

SIMULTANEOUS EQUATIONS

$2x + y = 4$

$2x - y = 0$

$4x = 4$

$\frac{4x}{4} = \frac{4}{4}$

$x = 1$

step 2 solve for y

$2(1) + y = 4$

$2 + y = 4$

$y = 4 - 2$

$y = 2$

$2x + y = 4$

$2x - y = 4$

$\frac{2x}{2} = \frac{4}{2}$

$x = 2$

$2(2) - y = 4$

$4 - y = 4$

$4 - 4 = y$

$0 = y$

$3x + 2y = 12$

$4x - y = 5$

$3x + 2y = 12$

$2(4x - y = 5)$

$3x + 2y = 12$

$8x - 2y = 10$

$\frac{11x}{11} = \frac{22}{11}$ $\quad x = 2$

$3(2) + 2y = 12$

$6 + 2y = 12$

$\frac{2y}{2} = \frac{6}{2}$

$y = 3$

LOGARITHMS

$\log_4 16 = 2$

$= 4^2 = 16$

$\log_3 x = 9$

$= 3^9 = x$

$\log_2 8 = x$

$2^x = 8$

$\log_4 16 = 2$

$4^2 = 16$

$\log_3 x = 9$

$3^9 = x$

NUMBER BASES

THE BINARY NUMBER SYSTEM

Convert binary to decimal

Base = 2

$1\,0\,1\,0_2 = D = 10_{10}$

$2^3 = 8 \quad 2^2 = 4 \quad 2^1 = 2 \quad 2^0 = 1$

$1 \times 8 \quad 0 \times 4 \quad 1 \times 2 \quad 0 \times 1$

$8 + 0 + 2 + 0$

$= 10$

$1\,0\,1\,0\,1\,0_2 = D$

$2^5 = 32 \quad 2^4 = 16 \quad 2^3 = 8 \quad 2^2 = 4 \quad 2^1 = 2 \quad 2^0 = 1$

$32 + 0 + 8 + 0 + 2 + 0$

$1\,1\,0\,0\,0\,1_2 = D = 49_{10}$

$2^5 = 32 \quad 2^4 = 16 \quad 2^3 = 8 \quad 2^2 = 4 \quad 2^1 = 2 \quad 2^0 = 1$

$32 \times 1 \quad 16 \times 1 \quad 8 \times 0 \quad 4 \times 0 \quad 2 \times 0 \quad 1 \times 1$

$32 + 16 + 0 + 0 + 0 + 1 = 49_{10}$

THE OCTAL NUMBER SYSTEM

Convert octal to decimal

$370_8 = D_{10} = 248_{10}$

3	7	0
8^2	8^1	8^0
64	8	1
3×64	7×8	0×1
$192 + 56 + 0 = 248$		

$1071_8 = D_{10} = 569$

1	0	7	1
8^3	8^2	8^1	8^0
512	64	8	1

$1 \times 512 + 0 \times 64 + 7 \times 7 + 1 \times 1$

$= 512 + 0 + 56 + 1 = 569_{10}$

THE HEXADECIMAL NUMBER SYSTEM

Note : 1,2,3,4,5,6,7,8,9,A,B,C,D,E,F

Convert hexadecimal to decimal

A=10,B=11,C=12,D=13, E=14,F=15

$23E_{16} = D_{10} = 574_{10}$

$2 \quad 3 \quad F$

$16^2 \quad 16^1 \quad 16^0$

$256 \quad 16 \quad 1$

$2 \times 256 + 16 \times 3 + 14 \times 1 =$

$256 + 16 + 14 =$

$2 \times 256 = 512$

$16 \times 3 = 48$

$512 + 48 + 14 = 574_{10}$

$F7D_{16} = D$

$F \quad 7 \quad D$

$16^2 \quad 16^1 \quad 16^0$

$256 \quad 16 \quad 1$

$15 \times 256 + 16 \times 7 + 13 \times 1$

$256 \times 15 = 3840$

$16 \times 7 = 112$

$13 \times 1 = 13$

$3840 + 112 + 13 = 3965$

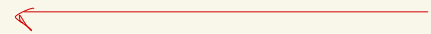
convert decimal to binary

$26_{10} = B_2$

$26 = 11010$

1 2 4 8, 16, 32

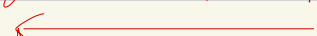
0 1 0 1 1



14_{10} to $B_2 = 1110$

1 2 4 8 16

0 1 1 1

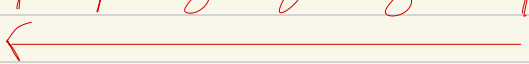


$2 + 4 + 8 = 14$

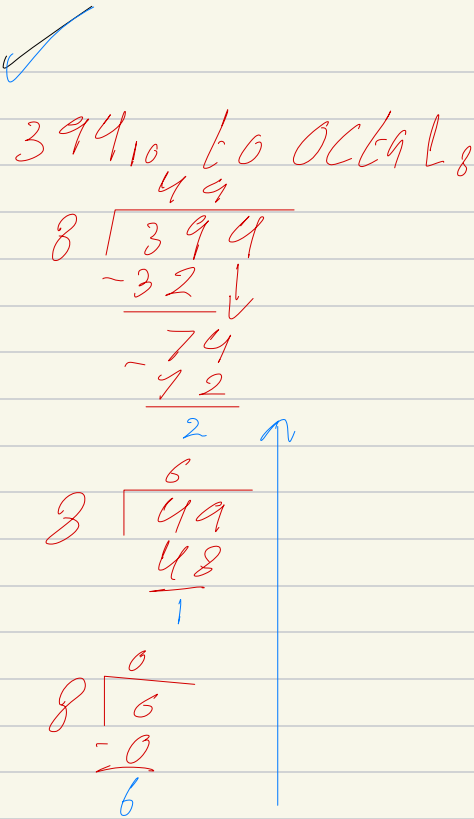
35_{10} to $B_2 = 100011$

1 2 4 8 16 32 64

1 1 0 0 0 1

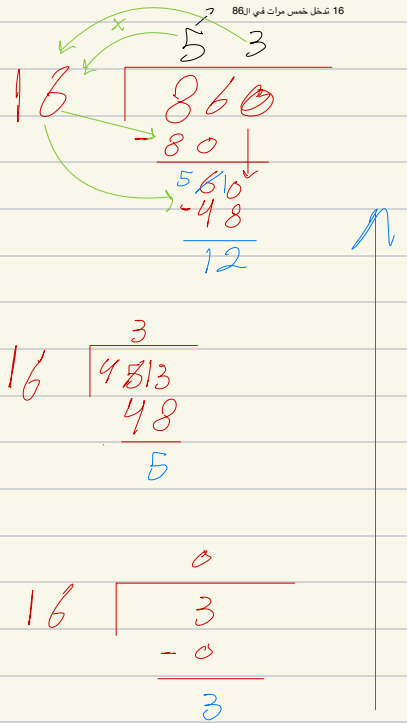


Convert decimal to octal



Convert decimal to hexadecimal

860_{10} to $Hex_{16} = 35C$



16
32
48
64
80