Series : Mathematics - from zero to engineer (3)

Review exercises

1) Place the appropriate symbols (< or >) between each of the following pairs of numbers

a) $-1 > -6$

b) $5 > -29$

c) $-14 < 7$

2) Calculate the value of each of the following expressions :

a) $16 - 12 \cdot 4 + 8 : 2 = 16 - 48 + 4 = -32 + 4 = -28$

b) $(16 - 12) \cdot (4 + 8) : 2 = 4 \cdot 12 : 2 = 48 : 2 = 24$

c) $9 - 3[17 + 5(5 - 7)] = 9 - 3[17 + 5 \cdot (-2)] = 9 - 3[17 - 10] = 9 - 3 \cdot 7 =$

$= 9 - 21 = -12$

d) $8[3(2 + 4) - 2(5 + 7)] = 8[3 \cdot 6 - 2 \cdot 12] = 8[18 - 24] = 8 \cdot (-6) = -48$

3) Prove that :

a) $6 - (3 - 2) \neq (6 - 3) - 2$

$6 - 1 \neq 3 - 2$

$5 \neq 1$

b) $100 : (10 : 5) \neq (100 : 10) : 5$

$100 : 2 \neq 10 : 5$

$50 \neq 2$

c) $24 : (2 + 6) \neq (24 : 2) + (24 : 6)$

$24 : 8 \neq 12 + 4$

$3 \neq 16$

d) $24 : (2 - 6) \neq (24 : 2) - (24 : 6)$

$24 : (-4) \neq 12 - 4$

$-6 \neq 8$

4) Round each number to the nearest 10, 100, and 1,000

a) 2562 → 2560 , 2600 , 3000

b) 1500 → 1500, 1500 , 2000

c) -3451 → -3450 , -3500 , -3000

d) -14 525 → -14 530 , -14500 , -15000

Factors and divisors.

a pair of numbers whose product equals a given number

$3 \cdot 6 = 18$

an integer that divides another number without a remainder

the divisors of 18 are 1, 2, 3, 6, 9, 18

the divisors of:

- 12 are 1, 2, 3, 4, 6, 12
- 25 are 1, 5, 25
- 17 are 1, 17.

this is an example of a prime number

(a prime number has exactly two divisors: 1 and itself)

Other prime numbers are:
2, 3, 5, 7, 11, 13...

Prime factorization

- every natural number can be expressed as a product of prime factors only

126	2
63	3
21	3
7	7
1	

$126 = 2 \cdot 3 \cdot 3 \cdot 7$

84	2
42	2
21	3
7	7
1	

$84 = 2 \cdot 2 \cdot 3 \cdot 7$

512	2
256	2
128	2
64	2
32	2
16	2
8	2
4	2
2	2
1	

$512 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

Greatest common divisor (GCD) and least common multiple (LCM).

144	2
72	2
36	2
18	2
9	3
3	3
1	

$144 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3$

66	2
33	3
11	11
1	

$66 = 2 \cdot 3 \cdot 11$

$GCD(144; 66) = 2 \cdot 3 = 6$

$LCM(144; 66) = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 11 = 1584$

$84 = 2 \cdot 2 \cdot 3 \cdot 7$

$512 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

$GCD(84; 512) = 2 \cdot 2 = 4$

$LCM(84; 512) = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 7 = 10752$