DIVISION SUMS

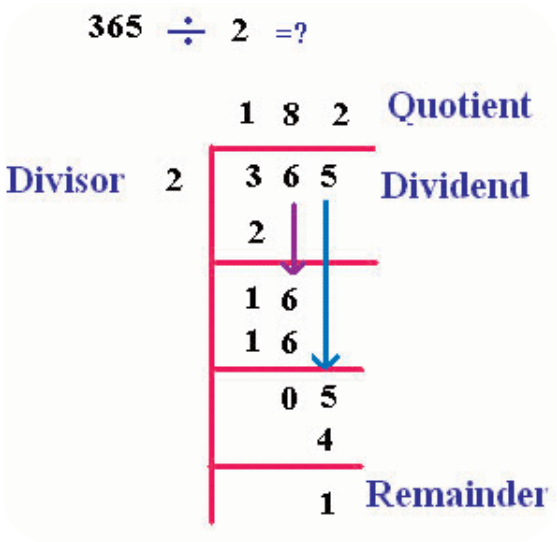
In a division sum we have four quantities namely -

i) Dividend (p)

ii) Divisor (d)

iii) Quotient (q)

iv) Remainder (r)



Divisor) Dividend (Quotient

Remainder

Dividend = (Divisor × Quotient) + Remainder

$P = (d \times q) + r$

Problems:

1. Find a number when divided by a divisor which is five times the quotient, gives a quotient which is four times the remainder the remainder being 10.

a) 8,000 b) 8,010 c) 8,500 d) 8,110

Ans: Remainder (r) = 10

Quotient (Q) = 4r = 4 × 10 = 40 = 40

Divisor (d) = 5 × 40 = 200

Dividend = (200 × 40) + 10 = 8,010

2. In a division sums the quotient is 120 the divisor 456 and the remainder 333. Find the dividend.

a) 5,553 b) 50,553 c) 56,053 d) 55,053

Ans: Quotient (Q) = 120,

Divisor (d) = 456

Remainder (r) = 333

Dividend (P) = (D × Q) + r

= (456 × 120) + 333 = 55,053

3. In a division sum the divisor is ten times the quotient and five times the remainder. what is the dividend if the remainder is 46 ?

a) 5,326 b) 5,306 c) 5,336 d) 5,366

Ans: Remainder (r) = 46

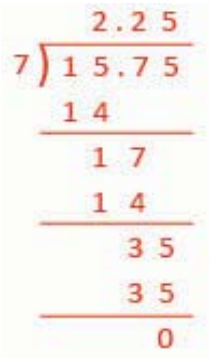
Divisor (d) = $5 \times r = 5 \times 46 = 230$

Divisor (d) = $10 \times q$

$10q = 230 \Rightarrow q = 23$

Dividend - $(D \times Q) + r = (230 \times 23 + 46)$

$= 5,336$



4. The quotient arising from a division of a number by 62 is 463 and the remainder is 60. what is the number ?

a) 28,666 b) 28,766 c) 28,576 D) 28,676

Ans: Divisor (d) = 62, quotient (Q) = 463

Remainder (r) = 60, find dividend

Dividend = (divisor $\times$ quotient) + remainder

$= (63 \times 463) + 60$

$= 28,766$

Divisors:

Divisor: Each one of the natural numbers that divides a given number exactly is called a divisor (or)

Factor of the given number is divisor

Ex: Each of the numbers 1, 3 and 5 divides 15 exactly

$\therefore \frac{15}{1}=15, \quad \frac{15}{3}=5, \quad \frac{15}{5}=3$

So, 1, 3 & 5 are divisors of "15"

* Every number has at least two different divisors
* Those numbers which contain only two different divisors are called Prime numbers
* The numbers containing more than two different divisors are called "Composite numbers"

Prime factors:

A factor of a given number is called a prime factor if this factor is a prime number.

Ex: The factors of 30 are 2, 3, & 5 are prime factors.

Prime factorisation

To express a given number as a product of prime factors is called prime factorisation of the given number.

Ex: Express '90' as a product of prime factors?

Ans: Divide 90 sucessively by primes

starts from least prime...

2	90
3	45
3	15
5	5
	1

$90 = 2 \times 3 \times 3 \times 5 \times 1$

$90 = 2 \times 3^2 \times 5$ (product of prime factors of 90)

Problems based on Divisors:

1. Express 108 as a product of prime factors.

a) $2^2 \times 3^2$ b) 2×3^2 c) $2^2 \times 3^3$ d) 2×3

Ans:

2	108
2	54
3	27
3	9
	3

$108 = 2 \times 2 \times 3 \times 3 \times 3 = 2^2 \times 3^3$

2. Express "2178" as a product of prime factors.

a) $2 \times 3 \times 11$ b) $2 \times 3^2 \times 11$ c) $2 \times 3^2 \times 11^2$ d) $3^2 \times 11^2$

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Ans:

2	2178
3	1089
3	363
11	121
	11

$2178 = 2 \times 3 \times 3 \times 11 \times 11$

$= 2 \times 3^2 \times 11^2$

3. The prime factors of 15,015 are..

a) 3, 5, 7, 11, 37 b) 3, 5, 11, 13, 37 c) 3, 5, 7, 13 ,37 d) 3, 5, 7, 11, 13

Ans:

3	15015
5	5005
11	1001
13	91
7	7
	1

$15015 = 3 \times 5 \times 11 \times 13 \times 7 \times 1$

$= 3 \times 5 \times 7 \times 11 \times 13$

4. Find the numbers of different prime factors used in $(21)^{17} \times (15)^{12} \times (51)^{9}$.

a) 2 b) 3 c) 4 d) 5

Ans:

$\Rightarrow (21)^{17} \times (15)^{12} \times (51)^{9}$

$\Rightarrow 3^{17} \times 7^{17} \times 3^{12} \times 5^{12} \times 3^{9} \times 17^{9} \Rightarrow 3, 5, 7, 17$

= "4" factors

5. Find the number of different prime factors used in $(15)^{13} \times (14)^{21} \times (62)^{7}$.

a) 3 b) 4 c) 5 d) 6

Ans: $(15)^{13} \times (14)^{21} \times (62)^{7}$

$\Rightarrow 3^{13} \times 5^{13} \times 2^{21} \times 7^{21} \times 2^{7} \times 31^{7}$

$\Rightarrow 2, 3, 5, 7, 13 \Rightarrow$ "5" factors

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6. What is the number of prime factors contained in the product $30^7 \times 22^5 \times 34^{11}$?

a) 23 b) 44 c) 46 d) 53

Ans: $30^7 \times 22^5 \times 34^{11}$

$\Rightarrow (2 \times 3 \times 5)^7 \times (2 \times 11)^5 \times (2 \times 17)^{11}$

$\Rightarrow 2^7 \times 2^5 \times 2^{11} \times 3^7 \times 5^7 \times 11^5 \times 17^{11}$

$\Rightarrow 2^{23} \times 3^7 \times 5^7 \times 11^5 \times 17^{11}$

$\Rightarrow 23 + 7 + 7 + 5 + 11 = 53$

7. What is the number of prime factors contained in the product $(21)^8 \times (77)^{11} \times (26)^2$?

a) 40 b) 41 c) 42 d) 43

Ans: $(3 \times 7)^8 \times (7 \times 11)^{11} \times (2 \times 13)^2$

$\Rightarrow 2^2 \times 3^8 \times 7^8 \times 7^{11} \times 11^{11} \times 13^2$

$\Rightarrow 2 + 8 + 19 + 11 + 2 = 42$

Theorem-1

Finding number of division of a composite number

To find the number of divisors of a composite number... "A" be a natural number

$$A = b^p \times c^q \times d^2 \times \ldots..$$

Here b, c & d are Distinct Prime Factors

The number of prime factors for "A" = (P + 1) (q + 1) (r + 1).....

Ex: 1. Find the number of factors for 21 .

a) 1 b) 2 c) 3 d) 4

Ans: $21 = 7^1 \times 3^1$

$A = b^p \times c^q$

Number of factors = (p + 1) (q + 1)

$= (1 + 1) (1 + 1) = 2 \times 2 = 4$

Verification:

The set of factors = { 1, 7, 3, 21}

2. Find the number of factors for "48" ?

a) 7 b) 8 c) 9 d) 10

Ans:

2	48
2	24
2	12
2	6
	3

$48 = 2^4 \times 3^1$

$A = b^q \times c^r$

Number of factors = (4 + 1) (1 + 1)

$= 5 \times 2$

$= 10$

Verification:

The set of factors of '48' is {1, 2, 3, 4, 6, 8, 12, 16, 24, 48}

3. The number of divisors of 600 is ?

a) 21 b) 22 c) 23 d) 24

Ans:

2	600
2	300
2	150
3	75
5	25
5	5
	1

$600 + 2^3 \times 3^1 \times 5^2$

Number of divisors = (3 + 1) (1 + 1) (2 + 1)

$= 4 \times 2 \times 3$

$= 24$