"Class- 5th"

"Winter Assignment"

Factors and Multiples

Factors:- A number which divides the dividend completely leaving no remainder.

Multiples:- The dividend which is divisible by its factors is called the multiple of any of its factors. eg.

$$4\overline{)24}\,|\,6 \quad \text{multiple}$$
$$\underline{24}$$
$$0$$

24 is the multiple of 4 and 6.

Test of Divisibility:- To find out whether a number can divide another (without actually dividing) we use the divisibility test.

Divisible by	Rule
2	No.'s ending with even digits are divisible by 2
3	Sum of digits of a no. must be multiple of 3
4	No. formed by last 2 digits of a no. should be ~~by~~ 4
5	No.'s ending with 0 or 5
6	No. must by divisible by 2 and 3 (both)

Divisible by	Rule.
7	Double the digits in the ones place. Subtract the answer from the no. without ones digit. if the difference is divisible by 7, then the no. is divisible by 7.
8	No. formed by last 3 digits should by divisible by 8.
9	Sum of digits must be a multiple of 9.
10	No. ending with '0' are divisible by 10.

Skill drill → Pg no. 36

A underline the number divisible by the given number.

1. 2 → 26819, 42836, 72915
   (follow the rule)
2. 6 → 4722, 85932, 61459.
3. 8 → 4328, 72416, 16088

B). Test whether the following are divisible by 7. and verify your answer.

2) 103523

1. Double the digit at ones place $3 \times 2 = 6$
2. Subtract the answer from the no. without ones digit $10352 - 6$
   $= 10346$
3. check the answer, whether it is divisiby by 7, then the no. is divisible by 7. $10346 \div 7$
   $= 1478$

Since the no. is divisible by 7.
$\therefore$ 103523 is divisible by 7.

Verification

$103523 \div 7$

$$
\begin{array}{r|l}
7 & 103523 \\
\hline
 & 14789 \\
 & 7 \\
\hline
 & 33 \\
 & 28 \\
\hline
 & 55 \\
 & 49 \\
\hline
 & 62 \\
 & 56 \\
\hline
 & 63 \\
 & 63 \\
\hline
 & \times.
\end{array}
$$

Since 10

Hence proved.

c | Find whether the following numbers are divisible by 11 and Verify your answer.

a) 86812

E O E O E
8 6 8 1 2

1. Sum of the digits in the odd places = 8 + 8 + 2
= 18

2. Sum of digits in the even places = 6 + 1 = 7.

3. their difference = 18 − 7 = 11.

Since the difference is 11.

∴ 86812 is divisible by 11.

Skill drill (Pg no. 37.

Test if the following are divisible by

a. 15 → 14475 , 134640 , 1470

1. Find the co-prime factors of 15 = 3 × 5

a) 14475

check if 14475 is divisible by both co-prime factors.

Divisible by 3

1 + 4 + 4 + 7 + 5 = 21

Divisible by 5

14475

∴ 14475 is divisible by 15.

Part B

Q Find the HCF by Prime factor Method.

Sol 24, 48, 248

2	24
2	12
2	6
3	3
	1

2	48
2	24
2	12
2	6
3	3
	1

2	248
2	124
2	62
31	31
	1

Prime factors of 24 = $2 \times 2 \times 2 \times 3$

Prime factors of 48 = $2 \times 2 \times 2 \times 2 \times 3$

Prime factors of 248 = $2 \times 2 \times 2 \times 31$

Common factors = $2 \times 2 \times 2$

= 8

HCF

{Do Remaning Parts}

Part C.

Q Find the HCF of the following using Prime factorisation by the short division method.

a) 150, 300, 396.

2	150, 300, 396
3	75, 150, 198
	25, 50, 66

HCF = $2 \times 3 = 6$

5, 24, 112, 672

2	24, 112, 672
2	12, 56, 336
2	6, 28, 168
	3, 14, 84

HCF = 2 × 2 × 2 = 8

8, 240, 1680

2	240, 1680
2	120, 840
2	60, 420
2	30, 210
3	15, 105
5	5, 35
	1, 7

HCF = 2 × 2 × 2 × 2 × 3 × 5

= 240.

{Do Remaning Parts}.

2. Part D:

Find the HCF of the following using long division method.

1) 84, 288

Divide the greater number by the smaller number.

$$
\begin{array}{r|l|l}
84 & 288 & 3 \\
 & -252 & \\
\hline
 & 36 & 84 \ |\ 2 \\
 & & -72 \\
\hline
 & & 12 \ |\ 36 \ |\ 3 \\
 & & \quad -36 \\
\hline
 & & \quad \times
\end{array}
$$

$\therefore$ HCF (84, 288) = 12.

3) 513, 2025

Divide the greater numbers by the smaller numbers.

$$
\begin{array}{r|l|l}
513 & 2025 & 3 \\
 & -1539 & \\
\hline
 & 486 & 513 \ |\ 1 \\
 & & -486 \\
\hline
 & & 27 \ |\ 486 \ |\ 18 \\
 & & \quad 486 \\
\hline
 & & \quad \times
\end{array}
$$

$\therefore$ HCF (513, 2025) = 27.

7,, 288, 420

Divide the greater number by the Smaller Number.

$$
\begin{array}{r|l|l}
288 & 420 & 1 \\
 & -288 & \\
\hline
 & 132 \;|\; 288 & 2 \\
 & -264 & \\
\hline
 & 24 \;|\; 132 & 5 \\
 & -120 & \\
\hline
 & 12 \;|\; 24 & 2 \\
 & 24 & \\
\hline
 & \times &
\end{array}
$$

∴, HCF (288, 420) = 12.

Do remaining parts.

"Part A"

2" Find the LCM by Prime factorisation?

1" 8, 10, 12

Sol

2 | 8
2 | 4
2 | 2
1

2 | 10
5 | 5
1

2 | 12
2 | 6
3 | 3
1

Prime factors of 8 = 2 × ② × 2 × 1

Prime factors of 10 = 2 × 5 × 1

Prime factors of 12 = 2 × ② × 3 × 1

LCM = Product of Common factors × Product of Uncommon factors

$2 \times 2 \times 1 \times 2 \times 5 \times 3 = 120.$

3" 105, 126, 147.

3 | 105
5 | 35
7 | 7
1

2 | 126
3 | 63
3 | 21
7 | 7
1

3 | 147
7 | 49
7 | 7
1.

Prime factors of 105 = ③ × 5 × ⑦ × ①

Prime factors of 126 = 2 × ③ × 3 × ⑦ × ①

Prime factors of 147 = ③ × 7 × ⑦ × ①

LCM = $3 \times 7 \times 1 \times 5 \times 2 \times 3 \times 7 = 4410.$

Q.. Find the Lcm by Short Division Method.

a.. 75, 125, 225

3	75, 125, 225
3	25, 125, 75
5	25, 125, 25
5	5, 25, 5
5	1, 5, 1
	1, 1, 1

LCM = $3 \times 3 \times 5 \times 5 \times 5 = 1125$

c.. 90, 104, 130

2	90, 104, 130
2	46, 52, 65
2	23, 26, 65
5	23, 13, 65
13	23, 13, 13
23	23, 1, 1
	1, 1, 1

LCM = $2 \times 2 \times 2 \times 5 \times 13 \times 23 = 11960$.

Do Remaning parts.

Complete the following statements.

Q3 The LCM of two Numbers is 20 and their HCF is 1. If One of the numbers is 4, the other is ____.

Sol One NO. = 4

Let the other Numbers = x

LCM of two Numbers = 20

HCF of two Numbers = 1

We know

Product of two numbers = HCF × LCM

$4 \times x = 20 \times 1$

$4x = 20$

$x = \frac{20}{4} = 5$

$\boxed{x = 5}$

$\therefore$ Other number = $x = 5$.

Q5 The Product of two Numbers is 375. If the LCM is 75, The HCF is

Sol Let HCF of two numbers be x

LCM of two numbers = 75

Product of two numbers = 375

But, Product of two numbers = HCF × LCM

$375 = x \times 75$

$375 = 75x$

$\frac{375}{75} = x$

$5 = x$

$\therefore$ HCF $= x = 5$

Q6 The Product of two numbers is 112. If the HCF is 2, the LCM is

Sol Let the LCM of 2 Numbers $= x$

HCF of 2 Numbers $= 2$

Product of two Numbers = HCF × LCM

$112 = 2 \cdot x$

$112 = 2x$

$\frac{56}{2} = x$

$56 = x$

$\therefore$ LCM $= x = 56$

Do remaning parts.

Word Problems

What is the greatest number that can divide 332 and 370 with remainder 4 and 1 respectively?

If we subtract 4 and 1 respectively to the dividends we have

$332 - 4 = 328$

$370 - 1 = 369$

∴ The resultant dividends will be exactly divisible by their HCF

$$\begin{array}{r|l} 328 & 369 \;|\; 1 \\ -328 & \\ \hline 41 & 328 \;|\; 8 \\ & -328 \\ & \hline & 0 \end{array}$$

∴ 41 is the greatest number.

Q2 Find the greatest number that can divide 285, 343, and 372 when 5 is added to each of them?

Sol Sol If we add 5 to the dividends, we have

$285 + 5 = 290$

$343 + 5 = 348$

$372 + 5 = 377$

∴ The resultant dividends will be exactly divisible by their HCF

$$
\begin{array}{r|l|l}
348 & 377 & 1 \\
 & -348 & \\
\hline
29 & 348 & 12 \\
 & -29\downarrow & \\
\hline
 & 58 & \\
 & 58 & \\
\hline
 & \times &
\end{array}
$$

Now, HCF of 29 and 290

$$
\begin{array}{r|l|l}
29 & 290 & 10 \\
 & -290 & \\
\hline
 & 0 &
\end{array}
$$

$\therefore$ 29 is the greatest number.

(Do remaning parts)

Word Problems

1. How many paper plates would be required to make complete groups of 20, 24 and 30?

Sol: LCM of 20, 24 and 30 by short division

2	20, 24, 30
2	10, 12, 15
2	5, 6, 15
3	5, 3, 15
5	5, 1, 5
	1, 1, 1

LCM = $2 \times 2 \times 2 \times 3 \times 5$

$\therefore$ 120 paper plates would be required to make complete group of 20, 24, and 30.

Q2. What number should be subtracted from 65 to make it divisible by 6, 12 and 15?

Sol: LCM of 6, 12, and 15 by short division method.

2	6, 12, 15
2	3, 6, 15
3	3, 3, 15
5	1, 1, 5
	1, 1, 1

LCM = $2 \times 2 \times 3 \times 5 = 60$

$\therefore$ $65 - 60 = 5$ is the number that has to be subtracted.

Q4 Three traffic signals glow at intervals of 5, 10 and 15 minutes. When will they glow togethes?

Sol LCM of 5, 10 and 15

2	5, 10, 15
5	5, 5, 15
3	1, 1, 3
	1, 1, 1

LCM = $2 \times 3 \times 5 = 30$

$\therefore$ They will glow together again after 30 minutes.

(Do rest of Parts)

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