

## LESSON 3 Least Common Multiple

### OBJECTIVE

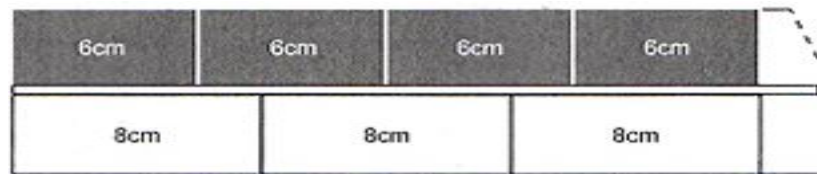
Find the common multiples and LCM of 2-4 numbers using continuous division.

Solve real life problems involving LCM of 2-3 given numbers.

Create problems involving LCM of 2-3 given numbers.

### ENGAGE

Judy Ann cuts out rectangular pieces of paper and lays them out as shown in drawing. Each rectangular piece of black paper is 6 cm long, while the white paper 8 cm long. What is the shortest length at which the pieces of paper will line up across both rows?



### EXPLORE

We can solve the problem by finding the least common multiple of the numbers using continuous division. We have learned this method from the previous lesson and we will apply the same steps in solving for the LCM. However, instead of multiplying all the common divisors alone, we will include the quotient to the last step. We have

$$\begin{array}{r|rr} 2 & 6 & 8 \\ \hline & 3 & 4 \end{array}$$

Since there is no more common divisor 3 and 4 we have 2 as the only common divisor. To solve for the LCM, we multiply the common divisor 2 by the quotient 3 and 4. Thus we have  $2 \times 3 \times 4 = 24$ . Therefore, the shortest length at which the pieces of paper will line up across two rows is 24 cm.

### EXPLAIN

A multiple of a number is the product of the number and any counting number. And just the like common factor, two or more numbers have also common multiples. The LCM then is the least common multiple of two or more numbers. For example, the LCM of relatively prime numbers are their product.

To find the LCM of the given numbers, we can use the method, and continuous division. Of the two method mentioned continuous division is more efficient: and helpful if three or more numbers are involved. Let us study the following examples.

Example 1 Find the LCM of 10, 15, and 8

Solution:

By listing multiples

Multiples of 10: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120

Multiples of 15: 15, 30, 45, 60, 75, 90, 105, 120

Multiples of 8: 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, 88, 96, 104, 112, 120

The LCM of 10, 15, and 8 is 120.

By Continuous Division

$$\begin{array}{r}
 2 \overline{) 10 \quad 15 \quad 8} \\
 5 \overline{) 5 \quad 15 \quad 4} \\
 3 \overline{) 1 \quad 3 \quad 4} \\
 4 \overline{) 1 \quad 1 \quad 4} \\
 1 \quad 1 \quad 1
 \end{array}$$

The LCM is  $2 \times 5 \times 1 \times 3 \times 4 = 120$

Example 2 What is the LCM of 24, 20, 28, and 32?

Solution:

$$\begin{array}{r}
 2 \overline{) 24 \quad 20 \quad 28 \quad 32} \\
 2 \overline{) 12 \quad 10 \quad 14 \quad 16} \\
 2 \overline{) 6 \quad 5 \quad 7 \quad 8} \\
 3 \overline{) 3 \quad 5 \quad 7 \quad 4} \\
 5 \overline{) 1 \quad 5 \quad 7 \quad 4} \\
 7 \overline{) 1 \quad 1 \quad 7 \quad 4} \\
 4 \overline{) 1 \quad 1 \quad 1 \quad 4} \\
 1 \quad 1 \quad 1 \quad 1
 \end{array}$$

$$2 \times 2 \times 2 \times 3 \times 5 \times 7 \times 4 = 3360$$

Answer: The LCM of 24, 20, 28, and 32 is 3360

## Application and Problem Solving

Example 4 Plane A flies to Davao every 4 days. Plane B flies to Davao every 8 days. If both planes are in Davao on July 17, what is the earliest date that both planes will be in Davao again.

### Understand.

- a. What is asked?
  - The earliest date that both planes will be in Davao again
- b. What are the given facts?
  - Plane A flies to Davao every 4 days
  - Plane B flies to Davao every 6 days
  - They are both in Davao in July 17

**Plan.** What strategy can we use to solve the problem?

We can use continuous division to solve the problem.

### Solve.

$$\begin{array}{r} 2 \overline{) 48} \\ 2 \overline{) 24} \\ 12 \end{array}$$
$$2 \times 2 \times 1 \times 2 = 8 \text{ days}$$

Answer: Both Planes A and B will be in Davao again on July 25.

### Check.

To check weather the answer is correct, we can use the listening method

Multiples of 4: 4, 8, 12, 16

Multiples of 8: 8, 16, 24, 32

Therefore, we have confirmed that after 8 days, that both planes will

Be in Davao again.