**Topic**: Least common multiple

**Question**: Find the least common multiple (LCM) of $4$ and $6$.

**Answer choices**:

A $10$

B $12$

C $24$

D $30$

**Solution**: B

The least common multiple of two positive whole numbers is the smallest number that's divisible by both of them. When the numbers are fairly small, one way to find the LCM is to list the first few positive multiples of each of them to see if we can find one that they have in common.

| | | | |
|---|---|---|---|
| $4 \cdot 1 =$ | $4$ | $6 \cdot 1 =$ | $6$ |
| $4 \cdot 2 =$ | $8$ | $6 \cdot 2 =$ | $12$ |
| $4 \cdot 3 =$ | $12$ | $6 \cdot 3 =$ | $18$ |
| $4 \cdot 4 =$ | $16$ | $6 \cdot 4 =$ | $24$ |
| $4 \cdot 5 =$ | $20$ | $6 \cdot 5 =$ | $30$ |
| $4 \cdot 6 =$ | $24$ | $6 \cdot 6 =$ | $36$ |

The first time they overlap is when $4 \cdot 3 = 12$ and $6 \cdot 2 = 12$. Therefore, the least common multiple of $4$ and $6$ is $12$.



**Topic**: Least common multiple

**Question**: Find the least common multiple (LCM) of $10$ and $24$.

**Answer choices**:

A $120$

B $240$

C $2$

D $10$

**Solution**: A

The least common multiple of two positive whole numbers is the smallest number that's divisible by both of them. When the numbers are a little larger, one way to find the LCM is to find their prime factorizations.

$$10$$

$$5 \cdot 2$$

$$24$$

$$12 \cdot 2$$

$$6 \cdot 2 \cdot 2$$

$$3 \cdot 2 \cdot 2 \cdot 2$$

The prime factorizations are

$$2 \cdot 5$$

$$2^3 \cdot 3$$

We get prime factors of $2$, $3$, and $5$. We have one factor of $2$ in $10$ and three factors of it in $24$, so we'll need three factors of $2$ in the LCM. We have zero factors of $3$ in $10$ and one factor of it in $24$, so we'll need one factor of $3$ in the LCM. We have one factor of $5$ in $10$ and zero factors of it in $24$, so we'll need one factor of it in the LCM. Therefore, our least common multiple is $2^3 \cdot 3 \cdot 5$. If we multiply this out to find one number, we get

$$2 \cdot 2 \cdot 2 \cdot 3 \cdot 5$$

$$4 \cdot 2 \cdot 3 \cdot 5$$

$$8 \cdot 3 \cdot 5$$

$$24 \cdot 5$$

120

**Topic**: Least common multiple

**Question**: Find the least common multiple (LCM) of the set.

$\{15, 100\}$

**Answer choices**:

A 300

B 100

C 15

D 1,500

**Solution**: A

The least common multiple of two numbers is the smallest value that's evenly divisible by both numbers. When the numbers in our set are a little larger, the best way to find the LCM is to break down each number into its product of primes.

$15$

$5 \cdot 3$

$100$

$50 \cdot 2$

$25 \cdot 2 \cdot 2$

$5 \cdot 5 \cdot 2 \cdot 2$

The product of primes are

$5 \cdot 3$

$5^2 \cdot 2^2$

Across both product of primes, we have factors of $2$, $3$, and $5$. We have to take the largest number of factors for each of those numbers. For example, there's only one factor of $5$ in $15$, but there are two factors of $5$ in $100$, which means we have to take two factors of $5$ for our LCM. We also have to take one factor of $3$ and two factors of $2$.

Therefore, our least common multiple is

$2^2 \cdot 3 \cdot 5^2$

$2 \cdot 2 \cdot 3 \cdot 5 \cdot 5$

$4 \cdot 3 \cdot 25$

$12 \cdot 25$

300