When the marbles in a bag are divided evenly between two friends, there is one marble left over. When the same marbles are divided evenly among three friends, there is one marble left over. When the marbles are divided evenly among five friends, there is one marble left over.

(i) What is the least possible number of marbles in the bag?

(ii) What is another possible number of marbles in the bag?

(i) In all three case one marble is left after division. Thus total marble will be one more than LCM of numbers.

$$\text{LCM}(2, 3, 5) = 2 \times 3 \times 5$$
$$= 30$$

Thus 31 marbles are in bag.

(ii) If we add one in multiple of 30, we will get another possible number of marble. These are 61, 91, 121....

Four satellites revolve around the earth once every 6, 8, 10, and 15 hr, respectively. If the satellites are initially lined up, how many hours must pass before they will again be lined up?

In order to know the minimum number of hours required for them to be aligned again, we have to find LCM of 6, 8, 10, and 15. First we find prime factorization of 6, 8, 10, and 15.

Now
$$6 = 2 \times 3$$
$$8 = 2 \times 2 \times 2$$
$$10 = 2 \times 5$$
$$15 = 3 \times 5$$
$$\text{LCM}(6, 8, 10, 15) = 2 \times 2 \times 2 \times 3 \times 5$$
$$= 120 \text{ hours}$$

It will take 120 hours or 5 days for the satellites to be aligned again.

Tina has 39 pairs of headphones and 13 music players. Tina wants to sell all of the headphones and music players in identical packages. What is the greatest number of packages Tina can make?

In order to know how many packages Tina can make, we need a number that is a factor of 39 and 13, so that the 39 pairs of headphones and the 13 music players can be divided up evenly. To find the greatest number of identical packages, we have to find the HCF of 39 and 13

First we have to find prime factorization of 13 and 39.

$$13 = 13$$

$$39 = 3 \times 13$$

$$\text{HCF } (13, 39) = 13$$

Tina can make 13 identical package.

In a morning walk, three persons step off together. Their steps measure 75 cm, 80 cm and 90 cm respectively. What is the minimum distance each should walk so that all can cover the same distance in complete steps?

The distance required by each of them is same as well as minimum, thus we have to find the least common multiple (LCM). First we find prime factorization of 75, 80 and 90.

Now

$$75 = 3 \times 5 \times 5$$

$$80 = 2 \times 2 \times 2 \times 2 \times 5$$

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

$$\text{LCM}(75, 80, 90) = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 5$$

$$= 3600 \text{ cm}$$

So the required minimum distance is 3600 cm.

Jasmin is completing an art project. She has two pieces of construction paper. The first piece is 44 centimeters wide and the second piece is 33 centimeters wide. Jasmin wants to cut the paper into strips that are equal in width and are as wide as possible. How wide should Jasmin cut each strip?

In order to know how wide Jasmin should cut each strip, we need a number that is a factor of 44 and 33, so that the piece that is 44 centimeters wide and the piece that is 33 centimeters wide can be cut into equal strips. To find the greatest width possible, we want to find the HCF of 44 and 33.

First we have to find prime factorization of 33 and 44.

$$33 = 3 \times 11$$

$$44 = 2 \times 2 \times 11$$

$$\text{HCF } (33, 44) = 11$$

Jasmin should cut 11 cm wide strip.

Three sets of English, Hindi and Mathematics books have to be stacked in such a way that all the books are stored topic wise and the height of each stack is the same. The number of English books is 96, the number of Hindi books is 240 and the number of Mathematics books is 336. Assuming that the books are of the same thickness, determine the number of stacks of English, Hindi and Mathematics books.

$96 = 2^5 \times 3, 240 = 2^4 \times 3 \times 5$ and $336 = 2^4 \times 3 \times 7$

$\therefore$ HCF of 96, 240 and 336 is $2^4 \times 3 = 48$

So, there must be 48 books in each stack.

$\therefore$ Number of stacks of English books $= \frac{96}{48} = 2$

Numberof stacks of Hindi books $= \frac{240}{48} = 5$

Number of stacks of Mathematics books $= \frac{336}{48} = 7$