

Highest Common Divisor

Classic Example

There are 42 Science books, 112 Mathematics books and 70 English books on Cindy's bookshelf.

She wants to arrange them into stacks in such a way that the number of Science, Mathematics and English books respectively in each stack is the same.

- (a) How many stacks of books will there be?
- (b) How many Science books are there in each stack?

Solution *Division by Prime*

- (i) Keep dividing the 3 numbers by a prime number, that is, 2, 3, 5, 7, 11 and so on.

$$2 \overline{) 42 \quad 112 \quad 70}$$

$$7 \overline{) 21 \quad 56 \quad 35}$$

$$\textcircled{3} \quad 8 \quad 5$$

- (ii) There are no more common factors for 3, 8 and 5.
- (iii) Multiply the divisors.
 - (a) $2 \times 7 = 14$ stacks
 - (b) Number of Science books in each stack $\rightarrow 42 \div 14 = 3$

Ans: (a) 14 stacks

(b) 3 Science books in each stack

Comment

The number of Science books in each stack is also the circled number in prime division.

Practice

- 1 A rectangular piece of paper measuring 90 cm by 42 cm is to be cut into squares of equal area without any wastage.
- (a) What is the side of each square?
- (b) How many such squares are there?

Ans: (a) _____ cm

(b) _____ squares

- 2** A rectangular piece of paper measuring 96 cm by 60 cm is to be cut into squares of equal area without wastage.
- (a)** What is the side of each square?
 - (b)** How many such squares are there?

Ans: (a) _____ cm

(b) _____ squares

Solutions:

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1

$$\begin{array}{r|l} 2 & 90 \quad 42 \\ \hline 3 & 45 \quad 21 \\ \hline & 15 \quad 7 \end{array}$$

Side of $2 \times 3 = 6$ cm

$15 \times 7 = 105$ pieces

Ans: (a) 6 cm

(b) 105 pieces

2

$$\begin{array}{r|l} 2 & 96 \quad 60 \\ \hline 2 & 48 \quad 30 \\ \hline 3 & 24 \quad 15 \\ \hline & 8 \quad 5 \end{array}$$

Side of $2 \times 2 \times 3 = 12$ cm

$8 \times 5 = 40$ squares

Ans: (a) 12 cm

(b) 40 squares