Factors and Multiples

(1) 18 is a factor of 72 → $2^2 \times 3^2$

↳ 2×3^2

$\frac{2^2 \times 3^2}{2 \times 3^2} \Rightarrow \frac{2 \times 2 \times 3^2}{2 \times 3^2} \Rightarrow 2 \times 2 \Rightarrow 4$

Because it is a whole number this is a factor

Q. Find the smallest +ve integer value of k such that 75k is a multiple of 12

$3 \times 5 \times 5$ ↵ $2 \times 2 \times 3$ ↵

To make this a multiple we have to multiply it by 4 so k = 4

$\frac{3 \times 5 \times 5}{2 \times 2 \times 3}$ ⇒ remainder is present

Q. Find the smallest integer value of k, such that 6 is a factor of 45k

$3 \times 3 \times 5 \times k$ ↵

2×3 ↳ = to the remainder in the denominator

k = 2

Q. Find the smallest integer value of k, such that 90k is a multiple of 75

2	90
3	45
3	15
5	5
	1

$2 \times 3 \times 3 \times 5 \times k$

$3 \times 5 \times 5$ ↵

left ↵

3	75
5	25
5	5
	1

k = 5

LCM and HCF

LCM (Lowest Common Multiple)

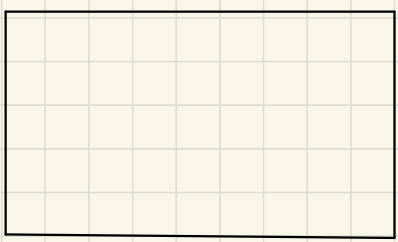
Bell A — Every 2 mins
Bell B — Every 3 mins
Bell C — Every 5 mins

After how many minutes do all three bells ring together

2	2, 3, 5
3	1, 3, 5
5	1, 1, 5
	1, 1, 1

$2 \times 3 \times 5 \rightarrow$ **30 mins**

HCF (Highest Common Factor)



Length of the largest possible squares that can be drawn inside without any left over area

2	18, 24
3	9, 12
	3, 4

$3 \times 2 = 6$ → **6ft by 6ft**

Find the LCM and HCF of the following

(i) 64, 72

$LCM = 2^6 \times 3^2 \rightarrow 576$

2	64, 72
2	32, 36
2	16, 18
2	8, 9
2	4, 9
2	2, 9
3	1, 9
3	1, 3
	1, 1

HCF → 8

2	64, 72
2	32, 36
2	16, 18
	8, 9

(ii) 72, 108

LCM → 216

2	72, 108
2	36, 54
3	18, 27
3	6, 9
2	2, 3
3	1, 3
	1, 1

HCF → 36

2	72, 108
2	36, 54
3	18, 27
3	6, 9
	2, 3

eg ⇒ LCM and HCF of 240 & 360

$240 = 2^4 \times 3 \times 5$ $\quad 360 = 2^3 \times 3^2 \times 5$

$LCM = 2^4 \times 3^2 \times 5$ ⇒ If you have 2 numbers written as a product of prime factors the higher or common power are taken.

$HCF = 2^3 \times 3 \times 5$

⇒ If you have 2 numbers written as a product of prime factors the lower or common power is taken

Qs

$A = 2^4 \times 3^2 \times 7$ and $B = 2^3 \times 3^4 \times 5$

(i) HCF ⟶ $2^3 \times 3^2$ → 72

(ii) Smallest integer value of P such that A×P is a square number

$2^4 \times 3^2 \times 7 \rightarrow 2^4 \times 3^2 \times 7^2$ square

P = 7

(iii) Smallest integer value of t such that B×t is a cube number

$2^3 \times 3^4 \times 5 \times t$; $t = 3^2 \times 5^2$ → 9×25

t = 225