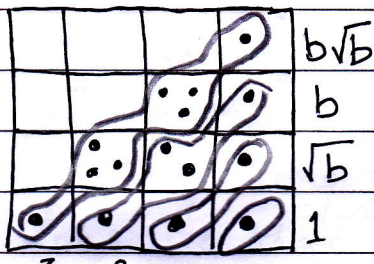
Let us see how we can visualize number system with base of the form $(a+\sqrt{b})$.

Consider a "2D-Exploding Dots" and fill them with DOTS as per the rules of the "PASCAL Triangle".



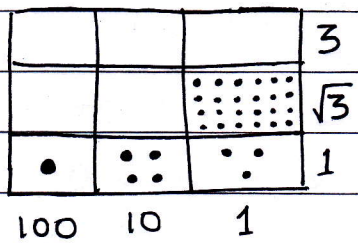
If $(a+\sqrt{b})$ is "X", then the dragonal pattern of dots represent X^0, X^1, X^2, X^3 & so on.

WOW, exactly what we want!

Lets name the dragonal patterns as D0, D1, D2, D3 & so on.

(Lets apply this to a problem) → Is $(143+24\sqrt{3})$ a multiple of $(10+\sqrt{3})$?

$143+24\sqrt{3}$ ⇨



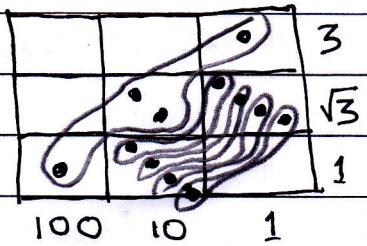
① 3 DOTS in box(1,1) explode to make 1 DOT in box(1,3)

② 20 DOTS in box(1,√3) explode to make 2 DOTS in box(10,√3)

⇩

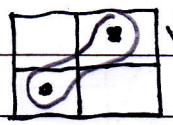
So, we found 1 pattern of type "D2" ⇦ & 4 patterns of type "D1"

∴ $(143+24\sqrt{3})$ is a multiple of $(10+\sqrt{3})$!!



Now if we want to find the quotient, we need to use "Nested" patterns. (Super Pattern)

$(10+\sqrt{3})$ ⇨



⇒ $10+\sqrt{3}$ is a pattern of 1-D1 pattern + 0-D0 pattern

$(143+24\sqrt{3})$ has

1 Super Pattern (1-D2 + 0-D1) ending @ D1 $(10+\sqrt{3})$

4 Super Pattern (1-D1 + 0-D0) ending @ D0 (1)

∴ QUOTIENT = $(10+\sqrt{3})+(4) = 14+\sqrt{3}$ //