Cube Root of a Binomial Quadratic Surd.

If $(a+\sqrt{b})^{1/3} = x+\sqrt{y}$ then $(a-\sqrt{b})^{2/3} = x-\sqrt{y}$, where *a* is a rational number and *b* is a surd.
Procedure of finding $(a+\sqrt{b})^{1/3}$ is illustrated with the help of an example:
Taking $(37-30\sqrt{3})^{1/3} = x+\sqrt{y}$ we get on cubing both sides, $37-30\sqrt{3}$
$= x^3+3xy-(3x^2+y)\sqrt{y}$
$\therefore x^3+3xy = 37$
$(3x^2+y)\sqrt{y} = 30\sqrt{3} = 15\sqrt{12}$

As $\sqrt{3}$ cannot be reduced, let us assume $y=3$ we get $3x^2+y = 3x^2+3 = 30 \therefore x = 3$
Which doesn't satisfy $x^3+3xy = 37$

Again taking $y=12$, we get
$3x^2+12=15$, $\therefore x=1$
$x=1, y=12$ Satisfy $x^3+3xy=37$
$\therefore \sqrt[3]{37-30\sqrt{3}} = 1-\sqrt{12} = 1-2\sqrt{3}$