4 質の高い教育を
みんなに

数学I
第1章　数と式
根号を含む計算発展

(例)

(1) $(1+\sqrt{2}-\sqrt{3})^2$

$A = 1+\sqrt{2}$ とおく

$= (A-\sqrt{3})^2$

$= A^2 - 2\sqrt{3}A + 3$

$= ((1+\sqrt{2})^2 - 2\sqrt{3}(1+\sqrt{2}) + 3$

$= 1+2\sqrt{2}+2-2\sqrt{3}-2\sqrt{6}+3 = 6+2\sqrt{2}-2\sqrt{3}-2\sqrt{6}$

$$(a+b+c)^2 = a^2+b^2+c^2+2(ab+bc+ca)$$

を利用

$(与式) = 1+2+3+2(\sqrt{2}-\sqrt{6}-\sqrt{3})$

$= 6+2\sqrt{2}-2\sqrt{3}-2\sqrt{6}$

(2) $\dfrac{1}{1+\sqrt{6}-\sqrt{7}}$ を有理化

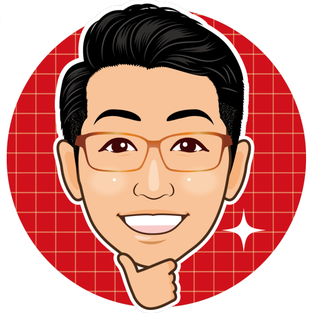
$\dfrac{1}{1+\sqrt{6}-\sqrt{7}} \times \dfrac{(1+\sqrt{6})+\sqrt{7}}{(1+\sqrt{6})+\sqrt{7}}$

- $1+\sqrt{6}+\sqrt{7}$ ☆
- $1-\sqrt{7}-\sqrt{6}$
- $\sqrt{6}-\sqrt{7}-1$

どれが正解?!

$= \dfrac{1+\sqrt{6}+\sqrt{7}}{(1+\sqrt{6})^2-7}$

$= \dfrac{1+\sqrt{6}+\sqrt{7}}{1+2\sqrt{6}+6-7} = \dfrac{1+\sqrt{6}+\sqrt{7}}{2\sqrt{6}} \times \dfrac{\sqrt{6}}{\sqrt{6}} = \dfrac{6+\sqrt{6}+\sqrt{42}}{12}$



Lucky?!

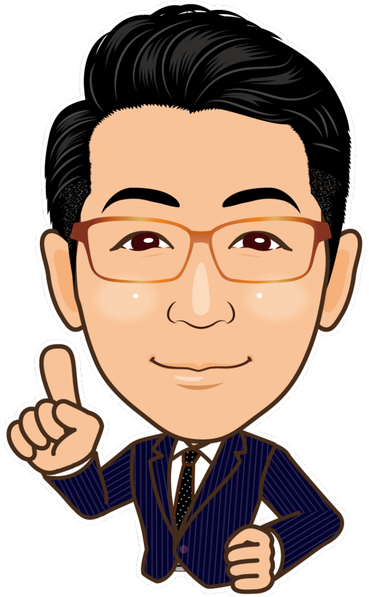
(3) $x=\dfrac{2}{\sqrt{6}-2}$, $y=\dfrac{2}{\sqrt{6}+2}$

(i) $x+y$ (ii) xy (iii) x^2+y^2

$x=\dfrac{2}{\sqrt{6}-2}\times\dfrac{\sqrt{6}+2}{\sqrt{6}+2}=\dfrac{2(\sqrt{6}+2)}{6-4}=\sqrt{6}+2$

同様に、

$y=\sqrt{6}-2$



(i) $x+y$

$=\sqrt{6}+2+\sqrt{6}-2$

$=\underline{2\sqrt{6}}$

(ii) $xy=(\sqrt{6}+2)(\sqrt{6}-2)$

$=6-4=\underline{2}$

(iii) x^2+y^2 は …

どうする?!

(4) $4+\sqrt{3}$ の 整数部分 a
小数部分 b

$a=5$

整数部分

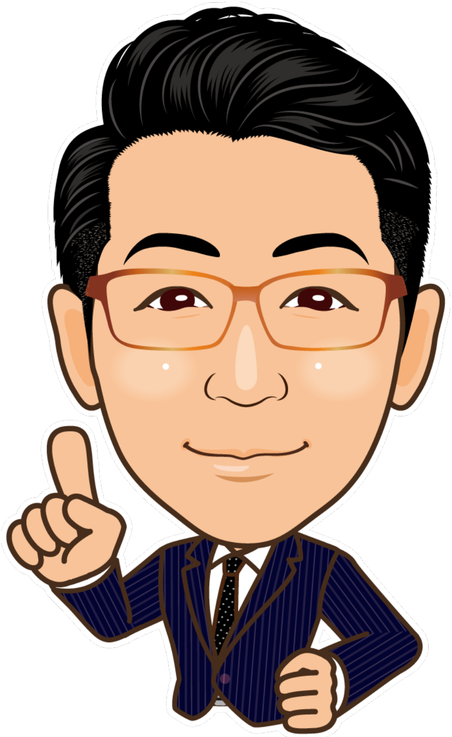
$b=4+\sqrt{3}-5$

$=\sqrt{3}-1$

$4+\sqrt{3}$

$1<\sqrt{3}<2$

$5<4+\sqrt{3}<6$



つまり、$4+\sqrt{3}=5$、……

a b