1 解答　8

$x^2+2xy+y^2=(x+y)^2$　← 先に式を因数分解する

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

$=(2\sqrt{2})^2$

$=8$

2 解答　(1)　①　28　②　36　③　$\sqrt{21}$

(2)　①　$8\sqrt{3}$　②　16　③　-12

(1)　①　$x^2+2xy+y^2=(x+y)^2$

$=\{(\sqrt{7}+\sqrt{3})+(\sqrt{7}-\sqrt{3})\}^2$

$=(2\sqrt{7})^2$

$=28$

②　$3x^2-6xy+3y^2=3(x^2-2xy+y^2)$

$=3(x-y)^2$

$=3\{(\sqrt{7}+\sqrt{3})-(\sqrt{7}-\sqrt{3})\}^2$

$=3\times(2\sqrt{3})^2$

$=36$

③　$\frac{1}{4}x^2-\frac{1}{4}y^2=\frac{1}{4}(x^2-y^2)$

$=\frac{1}{4}(x+y)(x-y)$

$=\frac{1}{4}\{(\sqrt{7}+\sqrt{3})+(\sqrt{7}-\sqrt{3})\}\times\{(\sqrt{7}+\sqrt{3})-(\sqrt{7}-\sqrt{3})\}$

$=\frac{1}{4}\times2\sqrt{7}\times2\sqrt{3}$

$=\sqrt{21}$

(2)　①　$x^2-y^2=(x+y)(x-y)$

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

$=2\sqrt{3}\times4$

$=8\sqrt{3}$

②　$x^2-2xy+y^2=(x-y)^2$

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

$=4^2$

$=16$

③　$x^3y+2x^2y^2+xy^3=xy(x^2+2xy+y^2)$

$=xy(x+y)^2$

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

$=(3-4)\times(2\sqrt{3})^2$

$=-12$

3 解答　18

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

$xy=(\sqrt{6}+\sqrt{3})(\sqrt{6}-\sqrt{3})=6-3=3$

であるから　$x^2+y^2=(x+y)^2-2xy$

$=(2\sqrt{6})^2-2\times3$

$=24-6$

$=18$