いろいろな計算② 解答と解説

1 [解答] (1) 8 (2) 2

(1) $\sqrt{5}\,x-\sqrt{3}\,y=\sqrt{5}(\sqrt{5}+\sqrt{3})-\sqrt{3}(\sqrt{5}-\sqrt{3})$

$\qquad\qquad\quad =\sqrt{5}\times\sqrt{5}+\sqrt{5}\times\sqrt{3}-\sqrt{3}\times\sqrt{5}+\sqrt{3}\times\sqrt{3}$

$\qquad\qquad\quad =5+3$

$\qquad\qquad\quad =8$

(2) $xy=(\sqrt{5}+\sqrt{3})(\sqrt{5}-\sqrt{3})$

$\qquad\quad =(\sqrt{5})^2-(\sqrt{3})^2$

$\qquad\quad =5-3$

$\qquad\quad =2$

2 [解答] (1) 14 (2) 66 (3) 22

(1) $x+y=(\sqrt{5}+\sqrt{2})+(\sqrt{5}-\sqrt{2})=2\sqrt{5}$

$\quad xy=(\sqrt{5}+\sqrt{2})(\sqrt{5}-\sqrt{2})=5-2=3$

このとき $\quad x^2+y^2=(x+y)^2-2xy$

$\qquad\qquad\qquad\quad =(2\sqrt{5})^2-2\times3$

$\qquad\qquad\qquad\quad =20-6$

$\qquad\qquad\qquad\quad =14$

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

$\quad xy=(3-\sqrt{2})(3+\sqrt{2})=9-2=7$

このとき $\quad 3x^2+3y^2=3(x^2+y^2)$

$\qquad\qquad\qquad\qquad =3\{(x+y)^2-2xy\}$

$\qquad\qquad\qquad\qquad =3(6^2-2\times7)$

$\qquad\qquad\qquad\qquad =3\times22$

$\qquad\qquad\qquad\qquad =66$

(3) $x+y=(\sqrt{6}+\sqrt{5})+(\sqrt{6}-\sqrt{5})=2\sqrt{6}$

$\quad xy=(\sqrt{6}+\sqrt{5})(\sqrt{6}-\sqrt{5})=6-5=1$

このとき $\quad \dfrac{y}{x}+\dfrac{x}{y}=\dfrac{y^2+x^2}{xy}$

$\qquad\qquad\qquad\quad =\dfrac{(x+y)^2-2xy}{xy}$

$\qquad\qquad\qquad\quad =\dfrac{(2\sqrt{6})^2-2\times1}{1}$

$\qquad\qquad\qquad\quad =24-2$

$\qquad\qquad\qquad\quad =22$