解法数学　確認プリント②　　(　　)組(　　)番　名前(　　)

1 次の式を因数分解せよ。

(1) $(x-2)^2-3(x-2)-18$

$(x-2)^2-3(x-2)-18=\{(x-2)+3\}\{(x-2)-6\}$
$=(x+1)(x-8)$

(2) x^4-17x^2+16

与式$=(x^2)^2-17x^2+16=(x^2-1)(x^2-16)$
$=(x+1)(x-1)(x+4)(x-4)$

(3) $a(x-2)-x+2$

$a(x-2)-x+2=a(x-2)-(x-2)=(a-1)(x-2)$

(4) $a^2-2a^2b+2b-a$

$a^2-2a^2b+2b-a=(-2a^2+2)b+a^2-a=-2(a+1)(a-1)b+a(a-1)$
$=(a-1)\{-2(a+1)b+a\}=(a-1)(-2ab+a-2b)$

(5) $x^2-4xy+4y^2-4$

$x^2-4xy+4y^2-4=(x^2-4xy+4y^2)-4=(x-2y)^2-2^2$
$=(x-2y+2)(x-2y-2)$

(6) x^4-81

与式$=(x^2)^2-9^2=(x^2+9)(x^2-9)=(x^2+9)(x+3)(x-3)$

(7) $(x^2-3x)^2-8(x^2-3x)-20$

与式$=\{(x^2-3x)+2\}\{(x^2-3x)-10\}=(x^2-3x+2)(x^2-3x-10)$
$=(x-1)(x-2)(x+2)(x-5)$

(8) $2a^2b-3ab+a-2b-2$

$2a^2b-3ab+a-2b-2=(2a^2-3a-2)b+a-2=(a-2)(2a+1)b+(a-2)$
$=(a-2)\{(2a+1)b+1\}=(a-2)(2ab+b+1)$

(9) $x^2+5xy+6y^2-2x-7y-3$

$x^2+5xy+6y^2-2x-7y-3=x^2+(5y-2)x+(6y^2-7y-3)$
$=x^2+(5y-2)x+(2y-3)(3y+1)$
$=\{x+(2y-3)\}\{x+(3y+1)\}$
$=(x+2y-3)(x+3y+1)$

$1 \times 2y-3 \longrightarrow 2y-3$
$1 \times 3y+1 \longrightarrow 3y+1$
$1 \quad (2y-3)(3y+1) \quad 5y-2$

2 次の値を求めよ。

(1) $|\sqrt{3}-2|$

$\sqrt{3}=1.732\cdots\cdots$ であるから　$\sqrt{3}-2<0$
よって　$|\sqrt{3}-2|=-(\sqrt{3}-2)=2-\sqrt{3}$

(2) $|-3|-|9|$

$|-3|-|9|=3-9=-6$

(3) $|7+4|-|-6+2|+|3-5|$

$|7+4|-|-6+2|+|3-5|=|11|-|-4|+|-2|=11-4+2=9$

3 $x=\dfrac{2}{\sqrt{6}-2}$, $y=\dfrac{2}{\sqrt{6}+2}$ のとき，次の式の値を求めよ。

(1) $x+y$

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

(2) xy

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

(3) x^2+y^2

$x^2+y^2=(x+y)^2-2xy=(2\sqrt{6})^2-2\cdot 2=20$

(4) x^3y+xy^3

$x^3y+xy^3=xy(x^2+y^2)=2\cdot 20=40$

4 次の循環小数 $0.\dot{4}5\dot{6}$ を分数で表せ。

$x=0.\dot{4}5\dot{6}$ とおく。

$x=\quad 0.456456\cdots\cdots$
$1000x=456.456456\cdots\cdots$

$1000x=456.456456\cdots\cdots$
$-)\quad x=\quad 0.456456\cdots\cdots$
$999x=456$

$1000x$ と x の差を考えると，右の計算から

$999x=456$　　よって　$x=\dfrac{456}{999}=\dfrac{152}{333}$

5 次の式を計算せよ。

(1) $4\sqrt{50}-2\sqrt{32}-\sqrt{72}$

$4\sqrt{50}-2\sqrt{32}-\sqrt{72}=4\sqrt{5^2\cdot 2}-2\sqrt{4^2\cdot 2}-\sqrt{6^2\cdot 2}$
$=20\sqrt{2}-8\sqrt{2}-6\sqrt{2}$
$=(20-8-6)\sqrt{2}=6\sqrt{2}$

(2) $(\sqrt{7}+\sqrt{2})(\sqrt{7}-\sqrt{2})$

$(\sqrt{7}+\sqrt{2})(\sqrt{7}-\sqrt{2})=(\sqrt{7})^2-(\sqrt{2})^2=7-2=5$

(3) $(\sqrt{5}-\sqrt{10})^2$

$(\sqrt{5}-\sqrt{10})^2=(\sqrt{5})^2-2\sqrt{5}\sqrt{10}+(\sqrt{10})^2$
$=5-2\sqrt{50}+10=5+10-2\sqrt{5^2\cdot 2}=15-10\sqrt{2}$

別解 $(\sqrt{5}-\sqrt{10})^2=\{\sqrt{5}(1-\sqrt{2})\}^2=(\sqrt{5})^2(1-\sqrt{2})^2$
$=5(1-2\sqrt{2}+2)=5(3-2\sqrt{2})$
$=15-10\sqrt{2}$

6 次の式を計算せよ。

(1) $\dfrac{1}{\sqrt{5}}-\dfrac{1}{\sqrt{20}}-\dfrac{1}{\sqrt{125}}$

$\dfrac{1}{\sqrt{5}}-\dfrac{1}{\sqrt{20}}-\dfrac{1}{\sqrt{125}}=\dfrac{1}{\sqrt{5}}-\dfrac{1}{2\sqrt{5}}-\dfrac{1}{5\sqrt{5}}$
$=\dfrac{\sqrt{5}}{\sqrt{5}\cdot\sqrt{5}}-\dfrac{\sqrt{5}}{2\sqrt{5}\cdot\sqrt{5}}-\dfrac{\sqrt{5}}{5\sqrt{5}\cdot\sqrt{5}}$
$=\dfrac{\sqrt{5}}{5}-\dfrac{\sqrt{5}}{10}-\dfrac{\sqrt{5}}{25}=\dfrac{10\sqrt{5}-5\sqrt{5}-2\sqrt{5}}{50}$
$=\dfrac{3\sqrt{5}}{50}$

(2) $\dfrac{\sqrt{5}}{\sqrt{3}+\sqrt{2}}+\dfrac{5\sqrt{5}}{\sqrt{8}+\sqrt{3}}$

$\dfrac{\sqrt{5}}{\sqrt{3}+\sqrt{2}}+\dfrac{5\sqrt{5}}{\sqrt{8}+\sqrt{3}}=\dfrac{\sqrt{5}(\sqrt{3}-\sqrt{2})}{(\sqrt{3}+\sqrt{2})(\sqrt{3}-\sqrt{2})}+\dfrac{5\sqrt{5}(\sqrt{8}-\sqrt{3})}{(\sqrt{8}+\sqrt{3})(\sqrt{8}-\sqrt{3})}$
$=\dfrac{\sqrt{5}(\sqrt{3}-\sqrt{2})}{3-2}+\dfrac{5\sqrt{5}(\sqrt{8}-\sqrt{3})}{8-3}$
$=\sqrt{5}(\sqrt{3}-\sqrt{2})+\sqrt{5}(\sqrt{8}-\sqrt{3})$
$=\sqrt{15}-\sqrt{10}+2\sqrt{10}-\sqrt{15}$
$=\sqrt{10}$