解答

1. (1) $\dfrac{2b^3c^4}{a}$　　(2) $\dfrac{x^2}{y^2}$　　(3) $\dfrac{x-1}{x+3}$

2. (1) $\dfrac{2(x+3)}{(x-3)(x+1)}$　　(2) $\dfrac{1}{(a+b)(a+2b)}$　　(3) $\dfrac{3x-1}{(x-2)(x+2)(x+3)}$

3. (1) $\dfrac{3c^3}{4a^2b}$　　(2) $\dfrac{(x-2)(x+3)}{(x-3)(x-4)}$

4. (1) $-\sqrt{2}$　　(2) $3-7\sqrt{6}$　　(3) $53-8\sqrt{15}$

5. (1) $\dfrac{2\sqrt{7}}{3}$　　(2) $\dfrac{\sqrt{7}+\sqrt{2}}{5}$　　(3) $\sqrt{2}-1$

解説

1. (1) 与式 $=\dfrac{32a^5b^5c^{10}}{16a^6b^2c^6}=\dfrac{2b^3c^4}{a}$　　(2) 与式 $=\dfrac{x^2(x+y)}{y^2(x+y)}=\dfrac{x^2}{y^2}$

(3) 与式 $=\dfrac{(x+2)(x-1)}{(x+2)(x+3)}=\dfrac{x-1}{x+3}$

2. (1) 与式 $=\dfrac{3(x+1)}{(x-3)(x+1)}-\dfrac{x-3}{(x-3)(x+1)}=\dfrac{3x+3}{(x-3)(x+1)}-\dfrac{x-3}{(x-3)(x+1)}=\dfrac{2x+6}{(x-3)(x+1)}$

$=\dfrac{2(x+3)}{(x-3)(x+1)}$

(2) 与式 $=\dfrac{1}{b(a+b)}-\dfrac{1}{b(a+2b)}=\dfrac{a+2b}{b(a+b)(a+2b)}-\dfrac{a+b}{b(a+b)(a+2b)}=\dfrac{b}{b(a+b)(a+2b)}=\dfrac{1}{(a+b)(a+2b)}$

(3) 与式 $=\dfrac{1}{(x-2)(x+2)}+\dfrac{2}{(x+2)(x+3)}=\dfrac{x+3}{(x-2)(x+2)(x+3)}+\dfrac{2(x-2)}{(x-2)(x+2)(x+3)}$

$=\dfrac{x+3}{(x-2)(x+2)(x+3)}+\dfrac{2x-4}{(x-2)(x+2)(x+3)}=\dfrac{3x-1}{(x-2)(x+2)(x+3)}$

3. (1) 与式 $=\dfrac{c}{b}\times\dfrac{3c^2}{4a^2}=\dfrac{3c^3}{4a^2b}$

(2) 与式 $=\dfrac{x^2-4}{x^2-9}\times\dfrac{x^2+6x+9}{x^2-2x-8}=\dfrac{(x-2)(x+2)}{(x-3)(x+3)}\times\dfrac{(x+3)^2}{(x+2)(x-4)}=\dfrac{x-2}{x-3}\times\dfrac{x+3}{x-4}=\dfrac{(x-2)(x+3)}{(x-3)(x-4)}$

4. (1) 与式 $=4\sqrt{2}+2\sqrt{2}-7\sqrt{2}=-\sqrt{2}$

(2) 与式 $=6\left(\sqrt{2}\right)^2+2\sqrt{6}-9\sqrt{6}-3\left(\sqrt{3}\right)^2=6\times2-7\sqrt{6}-3\times3=3-7\sqrt{6}$

(3) 与式 $=\left(4\sqrt{3}\right)^2-2\times4\sqrt{15}+\left(\sqrt{5}\right)^2=16\times3-8\sqrt{15}+5=53-8\sqrt{15}$

5. (1) 与式 $=\dfrac{14}{3\sqrt{7}}\times\dfrac{\sqrt{7}}{\sqrt{7}}=\dfrac{14\sqrt{7}}{3\left(\sqrt{7}\right)^2}=\dfrac{14\sqrt{7}}{3\times7}=\dfrac{2\sqrt{7}}{3}$

(2) 与式 $=\dfrac{\sqrt{7}+\sqrt{2}}{\left(\sqrt{7}-\sqrt{2}\right)\left(\sqrt{7}+\sqrt{2}\right)}=\dfrac{\sqrt{7}+\sqrt{2}}{\left(\sqrt{7}\right)^2-\left(\sqrt{2}\right)^2}=\dfrac{\sqrt{7}+\sqrt{2}}{7-2}=\dfrac{\sqrt{7}+\sqrt{2}}{5}$

(3) 与式 $=\dfrac{\left(1+\sqrt{2}\right)\left(3-2\sqrt{2}\right)}{\left(3+2\sqrt{2}\right)\left(3-2\sqrt{2}\right)}=\dfrac{3-2\sqrt{2}+3\sqrt{2}-2\left(\sqrt{2}\right)^2}{3^2-\left(2\sqrt{2}\right)^2}=\dfrac{3+\sqrt{2}-4}{9-8}=\sqrt{2}-1$