1. $f(a)=\dfrac{a^2-1}{a^2}$ 일 때, $f(10)\times f(11)\times f(12)\times\cdots\times f(99)$ 의 값은?

① $\dfrac{1}{9}$ ② $\dfrac{9}{10}$ ③ $\dfrac{10}{11}$ ④ $\dfrac{10}{99}$ ⑤ $\dfrac{20}{99}$

해설

$f(a)=\dfrac{a^2-1}{a^2}=\dfrac{a-1}{a}\cdot\dfrac{a+1}{a}$ 이므로

$f(10)\times f(11)\times f(12)\times\cdots\times f(99)$

$=\dfrac{9}{10}\cdot\dfrac{11}{10}\times\dfrac{10}{11}\cdot\dfrac{12}{11}\times\dfrac{11}{12}\cdot\dfrac{13}{12}\times\cdots\times\dfrac{98}{99}\cdot\dfrac{100}{99}$

$=\dfrac{9}{10}\times\dfrac{100}{99}$

$=\dfrac{10}{11}$

2. $a+b=3,\ ab=1$ 일 때, $a^2(a-b)+b^2(b-a)$ 의 값은?

① 13 ② 15 ③ 17 ④ 18 ⑤ 20

해설

$$(a-b)^2=(a+b)^2-4ab=3^2-4\times1=5$$

$$\begin{aligned}\therefore\ (\text{준식}) &= a^2(a-b)-b^2(a-b)\\ &= (a-b)\left(a^2-b^2\right)\\ &= (a-b)^2(a+b)\\ &= 5\times3=15\end{aligned}$$