1. 다음 중 $\sqrt{18}+2\sqrt{2}-\dfrac{2}{\sqrt{2}}$ 을 바르게 계산한 것은?

① $\sqrt{2}$ ② $2\sqrt{2}$ ③ $3\sqrt{2}$ ④ $4\sqrt{2}$ ⑤ $5\sqrt{2}$

해설

$$\begin{aligned}(\text{준식}) &= 3\sqrt{2}+2\sqrt{2}-\frac{2\times\sqrt{2}}{\sqrt{2}\times\sqrt{2}}\\ &= 5\sqrt{2}-\sqrt{2}\\ &= 4\sqrt{2}\end{aligned}$$

2. 다음 식 $\sqrt{3}(\sqrt{54}-\sqrt{6})+\dfrac{\sqrt{2}}{3}\div\sqrt{8}$ 을 간단히 한 것을 고르면?

① $2\sqrt{2}+\dfrac{1}{2}$ ② $3\sqrt{2}+\dfrac{1}{3}$ ③ $4\sqrt{2}+\dfrac{1}{4}$

④ $5\sqrt{2}+\dfrac{1}{5}$ ⑤ $6\sqrt{2}+\dfrac{1}{6}$

해설

$$\begin{aligned}(\text{준식}) &= \sqrt{162}-\sqrt{18}+\frac{\sqrt{2}}{3}\times\frac{1}{\sqrt{8}}\\ &= 9\sqrt{2}-3\sqrt{2}+\frac{1}{6}\\ &= 6\sqrt{2}+\frac{1}{6}\end{aligned}$$

3. $a=\sqrt{3}, b=\sqrt{7}$ 일 때, $\frac{b}{a}\times\frac{a}{b}$ 의 값은?

① 1 ② $3\sqrt{7}$ ③ 4 ④ 21 ⑤ 49

해설

$$\frac{b}{a}=\frac{\sqrt{7}}{\sqrt{3}}=\frac{\sqrt{7}\times\sqrt{3}}{\sqrt{3}\times\sqrt{3}}=\frac{\sqrt{21}}{3}$$

$$\frac{a}{b}=\frac{\sqrt{3}}{\sqrt{7}}=\frac{\sqrt{3}\times\sqrt{7}}{\sqrt{7}\times\sqrt{7}}=\frac{\sqrt{21}}{7}$$

$$\therefore \frac{b}{a}\times\frac{a}{b}=\frac{\sqrt{21}}{3}\times\frac{\sqrt{21}}{7}=\frac{\sqrt{21^2}}{21}=1$$

4. $\sqrt{15} \times \sqrt{20} = a\sqrt{3}$ 일 때, a 의 값은?

① 8 ② 10 ③ 12 ④ 15 ⑤ 18

해설

$$\begin{aligned}\sqrt{15} \times \sqrt{20} &= \sqrt{3 \times 5} \times \sqrt{2^2 \times 5} \\ &= \sqrt{2^2 \times 3 \times 5^2} \\ &= 10\sqrt{3}\end{aligned}$$

$\therefore a = 10$

5. 다음 중 계산 결과가 옳은 것의 개수는?

㉠ $2\sqrt{3} \div \sqrt{6} = \sqrt{2}$	㉡ $5\sqrt{2} \div \sqrt{5} = 5$
㉢ $\dfrac{9\sqrt{15}}{3\sqrt{15}} = \sqrt{3}$	㉣ $\dfrac{\sqrt{21}}{\sqrt{3}} = \sqrt{7}$
㉤ $8\sqrt{7} \div \sqrt{2} = 4\sqrt{2}$	

① 1 개 ② 2 개 ③ 3 개 ④ 4 개 ⑤ 5 개

해설

㉠ $2\sqrt{3} \div \sqrt{6} = \sqrt{2}$

㉡ $5\sqrt{2} \div \sqrt{5} = \sqrt{10}$

㉢ $\dfrac{9\sqrt{15}}{3\sqrt{15}} = 3$

㉣ $\dfrac{\sqrt{21}}{\sqrt{3}} = \sqrt{7}$

㉤ $8\sqrt{7} \div \sqrt{2} = 4\sqrt{14}$ 이므로

옳은 것은 ㉠, ㉣ 두 개이다.

6. $\dfrac{12\sqrt{a}}{\sqrt{12}}$ 의 분모를 유리화하였더니 $2\sqrt{6}$이 되었다. 이 때, 자연수 $\dfrac{1}{\sqrt{a}}$ 의 값은?

① $\dfrac{\sqrt{2}}{4}$ ② $\dfrac{\sqrt{2}}{3}$ ③ $\dfrac{\sqrt{2}}{2}$ ④ $\sqrt{2}$ ⑤ $2\sqrt{2}$

해설

$$\frac{12\sqrt{a}}{\sqrt{12}} = \frac{12\sqrt{a}}{2\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{12\sqrt{3a}}{6} = 2\sqrt{3a} = 2\sqrt{6}$$

$3a = 6$이므로 $a = 2$

$$\therefore \frac{1}{\sqrt{a}} = \frac{1}{\sqrt{2}} = \frac{1 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} = \frac{\sqrt{2}}{2}$$

7. $2\sqrt{6}\left(\frac{1}{\sqrt{3}}-\sqrt{6}\right)-\frac{a}{\sqrt{2}}(4\sqrt{2}-2)$ 가 유리수가 되도록 유리수 a 의 값을 정하면?

① -1 ② -2 ③ -3 ④ -4 ⑤ -5

해설

$$2\sqrt{6}\times\frac{1}{\sqrt{3}}-2\sqrt{6}\times\sqrt{6}-\frac{a}{\sqrt{2}}\times4\sqrt{2}+\frac{a}{\sqrt{2}}\times2$$

$$=2\sqrt{2}-12-4a+a\sqrt{2}$$

$$=\sqrt{2}(2+a)-12-4a$$

유리수가 되기 위해서 $a+2=0$

$\therefore\ a=-2$

8. $\sqrt{6} \times \sqrt{3} \div \sqrt{12}$ 을 간단히 한 것은?

① $\sqrt{2}$ ② $2\sqrt{2}$ ③ $3\sqrt{2}$ ④ $\frac{\sqrt{6}}{2}$ ⑤ $2\sqrt{2}$

해설

$$\sqrt{6} \times \frac{\sqrt{3}}{\sqrt{12}} = \sqrt{\frac{6 \times 3}{12}} = \sqrt{\frac{18}{12}} = \sqrt{\frac{3}{2}} = \frac{\sqrt{6}}{2}$$

9. 다음 중 옳지 <u>않은</u> 것을 모두 고른 것은?

㉠ $\sqrt{\frac{1}{3}}\sqrt{\frac{3}{4}}=\sqrt{\frac{1}{4}}=\frac{1}{2}$

㉡ $-\sqrt{60}\times\sqrt{\frac{2}{3}}=-4\sqrt{10}$

㉢ $\sqrt{3}\times\sqrt{12}=6$

㉣ $\sqrt{0.1}\times\sqrt{0.9}=\sqrt{0.09}=0.03$

㉤ $3\sqrt{5}\times 2\sqrt{7}=6\sqrt{35}$

① ㉠, ㉡ ② ㉠, ㉢ ③ ㉡, ㉢ ④ ㉡, ㉣ ⑤ ㉣, ㉤

해설

㉡ $-\sqrt{60}\times\sqrt{\frac{2}{3}}=-\sqrt{60\times\frac{2}{3}}$

$=-\sqrt{40}=-2\sqrt{10}$

㉣ $\sqrt{0.1}\times\sqrt{0.9}=\sqrt{0.09}=0.3$

10. $\sqrt{0.24} \div \sqrt{0.06} \div \sqrt{0.04}$ 를 간단히 하면?

① 6 ② 8 ③ 10 ④ 12 ⑤ 14

해설

$$\sqrt{\frac{24}{100}} \times \sqrt{\frac{100}{6}} \times \sqrt{\frac{100}{4}} = \sqrt{100} = 10$$

11. $\sqrt{5}=a$, $\sqrt{7}=b$ 라 할 때, $\sqrt{0.014}$ 를 a, b 를 사용하여 나타내면?

① $\frac{ab}{100}$ ② $\frac{ab}{50}$ ③ ab ④ $2ab$ ⑤ $4ab$

해설

$$\sqrt{0.014}=\sqrt{\frac{140}{10000}}=\frac{\sqrt{2^2\times 5\times 7}}{100}=\frac{2}{100}\times\sqrt{5}\times\sqrt{7}=\frac{1}{50}ab$$

12. $a > 0, b > 0$ 일 때, 다음 중 옳지 <u>않은</u> 것은?

① $\dfrac{b}{\sqrt{a}} = \dfrac{b\sqrt{a}}{a}$

② $\dfrac{\sqrt{b}}{c\sqrt{a}} = \dfrac{\sqrt{ab}}{ac}$

③ $\sqrt{\dfrac{a}{b}} = \dfrac{a\sqrt{b}}{b}$

④ $\dfrac{\sqrt{b}}{\sqrt{a}} = \dfrac{\sqrt{ab}}{a}$

⑤ $\dfrac{b}{c\sqrt{a}} = \dfrac{b\sqrt{a}}{ac}$

해설

③ $\sqrt{\dfrac{a}{b}} \times \dfrac{\sqrt{b}}{\sqrt{b}} = \dfrac{\sqrt{ab}}{b}$

13. $a = \sqrt{2}$ 일 때, $b = 2a - \frac{3}{a}$ 이면 b 는 a 의 몇 배인가?

① 2 배 ② $\sqrt{2}$ 배 ③ $\frac{3}{2}$ 배

④ $\frac{1}{2}$ 배 ⑤ 3 배

해설

$$b = 2a - \frac{3}{a} = 2\sqrt{2} - \frac{3}{\sqrt{2}}$$

$$= 2\sqrt{2} - \frac{3\sqrt{2}}{2} = \left(2 - \frac{3}{2}\right)\sqrt{2} = \frac{1}{2}a$$

14. $\sqrt{3}(\sqrt{10}-\sqrt{15})\div\sqrt{5}$ 를 계산하면?

① $\sqrt{6}-3$ ② $6-\sqrt{3}$ ③ $\sqrt{6}-\sqrt{3}$

④ $\sqrt{6}+3$ ⑤ $\sqrt{6}+\sqrt{3}$

해설

$$\begin{aligned}(\text{준식}) &= (\sqrt{3}\sqrt{10}-\sqrt{15}\sqrt{3})\div\sqrt{5}\\ &= (\sqrt{30}-\sqrt{45})\div\sqrt{5}\\ &= \sqrt{6}-\sqrt{9}\\ &= \sqrt{6}-3\end{aligned}$$

15. $f(x) = \sqrt{x+2} - \sqrt{x+1}$ 일 때, $f(0)+f(1)+f(2)+\cdots+f(99)+f(100)$ 의 값을 구하면?

① -1 ② $\sqrt{101}-1$ ③ $\sqrt{102}-1$

④ $\sqrt{102}-\sqrt{101}$ ⑤ $\sqrt{102}$

해설

$f(0) = \sqrt{2} - \sqrt{1} = -1 + \sqrt{2}$
$f(1) = \sqrt{3} - \sqrt{2} = -\sqrt{2} + \sqrt{3}$
$f(2) = \sqrt{4} - \sqrt{3} = -\sqrt{3} + \sqrt{4}\cdots$
$f(99) = \sqrt{101} - \sqrt{100} = -\sqrt{100} + \sqrt{101}$
$f(100) = \sqrt{102} - \sqrt{101} = -\sqrt{101} + \sqrt{102}$
$\therefore f(0) + f(1) + f(2) + \cdots + f(99) + f(100)$
$= -1 + \sqrt{2} - \sqrt{2} + \sqrt{3} + -\sqrt{3} + \sqrt{4} + \cdots - \sqrt{100} + \sqrt{101} - \sqrt{101} + \sqrt{102}$
$= -1 + (\sqrt{2} - \sqrt{2}) + (\sqrt{3} - \sqrt{3}) + (\sqrt{4} + \cdots - \sqrt{100}) + (\sqrt{101} - \sqrt{101}) + \sqrt{102}$
$= -1 + (0) + (0) + (0) + \sqrt{102}$
$= -1 + \sqrt{102}$