**1.** $\sqrt{12} \times \sqrt{15} \times \sqrt{35} = a\sqrt{7}$ 일 때, $a$ 의 값은?

① 15 ② 20 ③ 25 ④ 30 ⑤ 35

해설

$\sqrt{12} \times \sqrt{15} \times \sqrt{35}$

$= \sqrt{2^2 \times 3} \times \sqrt{3 \times 5} \times \sqrt{5 \times 7}$

$= 30\sqrt{7}$

**2.** $\sqrt{72} = a\sqrt{2},\ \sqrt{300} = b\sqrt{3}$ 일 때, $a - b$ 의 값은?

① $-2$ ② $-4$ ③ $4$ ④ $6$ ⑤ $8$

해설

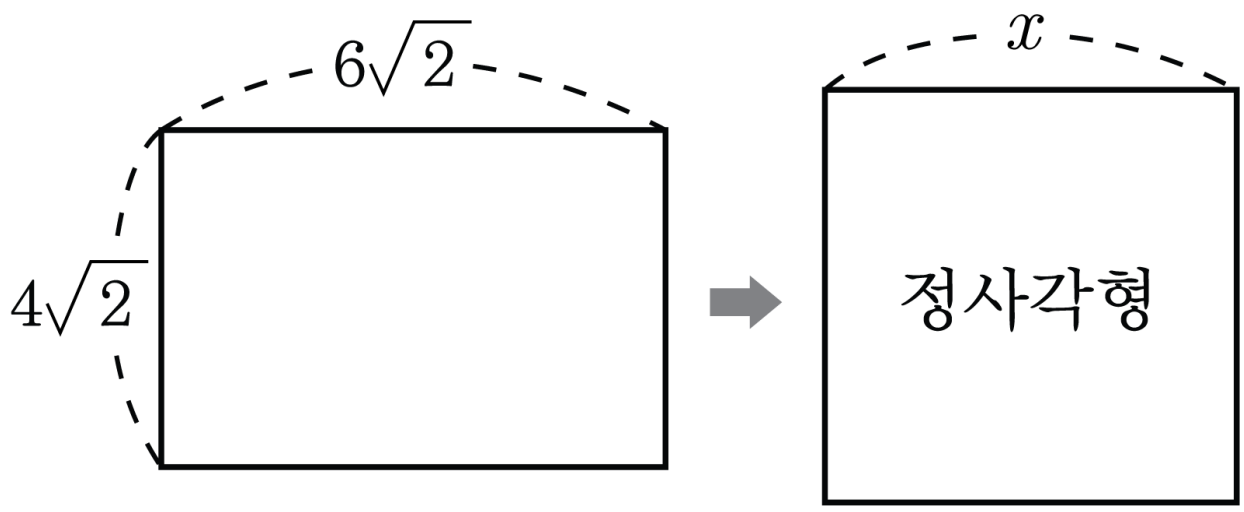
$\sqrt{72} = \sqrt{2^2 \times 3^2 \times 2} = 6\sqrt{2}$

$\sqrt{300} = \sqrt{10^2 \times 3} = 10\sqrt{3}$

$\therefore\ a = 6,\ b = 10$

$\therefore\ a - b = -4$

**3.** 가로의 길이가 $6\sqrt{2}$ 이고, 세로의 길이가 $4\sqrt{2}$ 인 직사각형과 넓이가 같은 정사각형의 한 변의 길이 $x$ 를 $a\sqrt{b}$ 의 꼴로 나타내면? (단, $b$ 는 제곱인 인수가 없는 자연수)




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

해설

직사각형의 넓이는 $6\sqrt{2} \times 4\sqrt{2} = 48$ 이다.
따라서 $x^2 = 48$ 이므로 정사각형의 한 변의 길이는 $\sqrt{48} = 4\sqrt{3}$ 이다.

**4.** $\sqrt{99}\sqrt{715} = A\sqrt{65}$, $6\sqrt{5} = \sqrt{B}$ 일 때, $B - A$ 의 값을 구하면?

① 144 ② 145 ③ 146 ④ 147 ⑤ 148

해설

$$\sqrt{99}\sqrt{715} = \sqrt{3^2 \times 11}\sqrt{5 \times 11 \times 13}$$
$$= \sqrt{3^2 \times 5 \times 11^2 \times 13} = 33\sqrt{65}$$

$\therefore A = 33$

$6\sqrt{5} = \sqrt{6^2 \times 5} = \sqrt{180}$

$\therefore B = 180$

$\therefore B - A = 180 - 33 = 147$

**5.** 다음을 만족하는 유리수 $a$, $b$, $c$에 대하여 $\sqrt{\dfrac{2ab}{c}}$ 의 값은?

$$\frac{1}{2}\sqrt{8}=\sqrt{a},\quad \sqrt{135}=3\sqrt{b},\quad \sqrt{2000}=c\sqrt{5}$$

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

해설

$$\frac{1}{2}\sqrt{8}=\sqrt{\left(\frac{1}{2}\right)^2\times 8}=\sqrt{\frac{8}{4}}=\sqrt{2}=\sqrt{a}$$

$\therefore a=2$

$\sqrt{135}=\sqrt{3^3\times 5}=3\sqrt{15}=3\sqrt{b}$

$\therefore b=15$

$\sqrt{2000}=\sqrt{20^2\times 5}=20\sqrt{5}=c\sqrt{5}$

$\therefore c=20$

$$\therefore \sqrt{\frac{2ab}{c}}=\sqrt{\frac{2\times 2\times 15}{20}}=\sqrt{3}$$

**6.** 다음 수를 근호 안의 수가 가장 작은 자연수가 되도록 $a\sqrt{b}$ 의 꼴로 나타낸 것 중 <u>틀린</u> 것은?

① $\sqrt{\frac{27}{121}} = \frac{3\sqrt{3}}{11}$

② $\sqrt{0.005} = \frac{\sqrt{2}}{20}$

③ $\sqrt{0.12} = \frac{\sqrt{3}}{3}$

④ $\sqrt{\frac{2}{49}} = \frac{\sqrt{2}}{7}$

⑤ $\sqrt{\frac{12}{32}} = \frac{\sqrt{6}}{4}$

해설

① $\sqrt{\frac{27}{121}} = \sqrt{\frac{3^3 \times 3}{11^2}} = \frac{3\sqrt{3}}{11}$

② $\sqrt{0.005} = \sqrt{\frac{50}{10000}} = \sqrt{\frac{5^2 \times 2}{100^2}}$

$= \frac{5\sqrt{2}}{100} = \frac{\sqrt{2}}{20}$

③ $\sqrt{0.12} = \sqrt{\frac{12}{100}} = \frac{\sqrt{12}}{10} = \frac{1}{10} \times 2\sqrt{3} = \frac{\sqrt{3}}{5}$

④ $\sqrt{\frac{2}{49}} = \sqrt{\frac{2}{7^2}} = \frac{\sqrt{2}}{7}$

⑤ $\sqrt{\frac{12}{32}} = \sqrt{\frac{6}{16}} = \frac{\sqrt{6}}{4}$

**7.** $\sqrt{1.92} = a\sqrt{3}$, $\sqrt{\frac{63}{64}} = b\sqrt{7}$ 일 때, 유리수 $a$, $b$ 에 대하여 $ab$ 의 값을 구하면?

① 0.3 ② 0.5 ③ 1 ④ 1.5 ⑤ 3

해설

$$\sqrt{1.92} = \sqrt{\frac{192}{100}} = \sqrt{\frac{8^2 \times 3}{10^2}} = \frac{8\sqrt{3}}{10} = \frac{4}{5}\sqrt{3}$$

$$\therefore a = \frac{4}{5}$$

$$\sqrt{\frac{63}{64}} = \sqrt{\frac{3^2 \times 7}{8^2}} = \frac{3\sqrt{7}}{8}$$

$$\therefore b = \frac{3}{8}$$

$$\therefore ab = \frac{4}{5} \times \frac{3}{8} = \frac{3}{10} = 0.3$$

**8.** 다음 보기의 네 개의 수를 작은 순서부터 나열할 때, 바르게 나타낸 것은?

보기

㉠ $\sqrt{0.28}$ ㉡ $\frac{\sqrt{7}}{2}$

㉢ $\sqrt{\frac{14}{18}}$ ㉣ $\sqrt{\frac{7}{169}}$

① ㉣<㉢<㉡<㉠ ② ㉣<㉠<㉢<㉡ ③ ㉣<㉠<㉡<㉢

④ ㉢<㉣<㉠<㉡ ⑤ ㉡<㉢<㉠<㉣

해설

㉠ $\sqrt{0.28}=\sqrt{\frac{28}{100}}=\sqrt{\frac{7}{25}}=\frac{\sqrt{7}}{5}$

㉡ $\frac{\sqrt{7}}{2}$

㉢ $\sqrt{\frac{14}{18}}=\sqrt{\frac{7}{9}}=\frac{\sqrt{7}}{3}$

㉣ $\sqrt{\frac{7}{169}}=\sqrt{\frac{7}{13^2}}=\frac{\sqrt{7}}{13}$

$\therefore$ ㉣<㉠<㉢<㉡

**9.** $\sqrt{0.96}$ 은 $\sqrt{6}$ 의 $x$ 배이다. 이 때, $x$ 의 값은?

① $\frac{1}{5}$ ② $\frac{2}{5}$ ③ $\frac{8}{5}$ ④ $\frac{12}{5}$ ⑤ $\frac{16}{5}$

해설

$$\sqrt{0.96} = \sqrt{\frac{96}{100}} = \sqrt{\frac{4^2 \times 6}{10^2}} = \frac{4}{10}\sqrt{6} = \frac{2}{5}\sqrt{6}$$

$$\therefore\ x = \frac{2}{5}$$

**10.** 분모를 유리화한다고 할 때, $\dfrac{\sqrt{6}}{\sqrt{45}} = \dfrac{\sqrt{6} \times \square}{3 \times \square \times \square}$ 에서, $\square$ 안에 공통으로 들어갈 수는?

① $\sqrt{2}$ ② $\sqrt{3}$ ③ $\sqrt{5}$ ④ $\sqrt{6}$ ⑤ $\sqrt{15}$

해설

$$\frac{\sqrt{6}}{\sqrt{45}} = \frac{\sqrt{6}}{3\sqrt{5}} = \frac{\sqrt{6} \times \sqrt{5}}{3\sqrt{5} \times \sqrt{5}} = \frac{\sqrt{30}}{15}$$

$\therefore \square = \sqrt{5}$

**11.** 분수 $\dfrac{3\sqrt{10}-\sqrt{18}}{\sqrt{5}}$ 의 분모를 유리화하면?

① $\dfrac{10\sqrt{2}-3\sqrt{10}}{5}$

② $\dfrac{10\sqrt{2}+3\sqrt{10}}{5}$

③ $\dfrac{15\sqrt{2}-3\sqrt{10}}{5}$

④ $\dfrac{15\sqrt{2}+3\sqrt{10}}{5}$

⑤ $\dfrac{-15\sqrt{2}+3\sqrt{10}}{5}$

해설

$$(\text{준식}) = \frac{(3\sqrt{10}-\sqrt{18})\times\sqrt{5}}{\sqrt{5}\times\sqrt{5}} = \frac{15\sqrt{2}-3\sqrt{10}}{5}$$

**12.** $\dfrac{3\sqrt{a-4}}{\sqrt{18}} = 3$ 일 때, $a$ 의 값은?

① 24 ② 22 ③ 20 ④ 18 ⑤ 16

해설

$$\frac{3\sqrt{a-4}}{\sqrt{18}} = \frac{3\sqrt{a-4}\times\sqrt{2}}{3\sqrt{2}\times\sqrt{2}} = \frac{\sqrt{a-4}\times\sqrt{2}}{2} = 3$$

$$\sqrt{a-4}\times\sqrt{2} = 6 = \sqrt{36}$$

$$(a-4)\times 2 = 36$$

$$a-4 = 18$$

$$\therefore a = 22$$

**13.** $x = 3 + \sqrt{2}$ 일 때, $\dfrac{x+7}{x-3}$ 의 값은?

① $-1 + 5\sqrt{2}$ ② $1 - 3\sqrt{2}$ ③ $1 + 5\sqrt{2}$

④ $2 + 2\sqrt{2}$ ⑤ $2 + 5\sqrt{2}$

해설

$$\frac{x+7}{x-3} = \frac{10+\sqrt{2}}{\sqrt{2}} = \frac{10+\sqrt{2}}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = 5\sqrt{2} + 1$$

**14.** $A = 3\sqrt{3} + 7\sqrt{3} - 2\sqrt{3}$ , $B = 8\sqrt{6} - 9\sqrt{6} - 14\sqrt{6}$ 일 때, $A + B$의 값은?

① $-7\sqrt{3}$ ② $-7\sqrt{6}$ ③ $-8\sqrt{3} + 15\sqrt{6}$

④ $6\sqrt{3} - 5\sqrt{6}$ ⑤ $8\sqrt{3} - 15\sqrt{6}$

해설

$A = 3\sqrt{3} + 7\sqrt{3} - 2\sqrt{3} = 8\sqrt{3}$

$B = 8\sqrt{6} - 9\sqrt{6} - 14\sqrt{6} = -15\sqrt{6}$

$\therefore A + B = 8\sqrt{3} - 15\sqrt{6}$

**15.** $\frac{\sqrt{3}}{3}+\frac{\sqrt{5}}{6}-\frac{\sqrt{3}}{4}-\frac{\sqrt{5}}{2}$ 을 간단히 나타내면?

① $-\frac{\sqrt{3}}{12}-\frac{\sqrt{5}}{12}$ ② $\frac{\sqrt{3}}{12}+\frac{\sqrt{5}}{3}$ ③ $\frac{\sqrt{3}}{12}-\frac{\sqrt{5}}{3}$

④ $\frac{\sqrt{3}}{6}-\frac{\sqrt{5}}{6}$ ⑤ $\frac{\sqrt{3}}{3}+\frac{\sqrt{5}}{3}$

해설

$$\frac{\sqrt{3}}{3}+\frac{\sqrt{5}}{6}-\frac{\sqrt{3}}{4}-\frac{\sqrt{5}}{2}$$

$$=\frac{4\sqrt{3}-3\sqrt{3}}{12}+\frac{\sqrt{5}-3\sqrt{5}}{6}$$

$$=\frac{\sqrt{3}}{12}-\frac{\sqrt{5}}{3}$$

**16.** 다음 식을 간단히 하면?

$\sqrt{12} + \sqrt{3} - \sqrt{48}$

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

④ $-2\sqrt{3}$ ⑤ $7\sqrt{3}$

해설

$$\begin{aligned}\sqrt{12} + \sqrt{3} - \sqrt{48} &= 2\sqrt{3} + \sqrt{3} - 4\sqrt{3} \\ &= -\sqrt{3}\end{aligned}$$

**17.** $\sqrt{48}-2\sqrt{3}-\dfrac{3}{\sqrt{27}}$ 을 간단히 하면?

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

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

해설

$$4\sqrt{3}-2\sqrt{3}-\frac{3}{3\sqrt{3}}=2\sqrt{3}-\frac{\sqrt{3}}{3}=\frac{5}{3}\sqrt{3}$$

**18.** $\sqrt{18}+\sqrt{48}-2\sqrt{27}+3\sqrt{50}$ 을 간단히 하면?

① $14\sqrt{2}+4\sqrt{3}$ ② $14\sqrt{2}-4\sqrt{3}$ ③ $18\sqrt{2}-2\sqrt{3}$

④ $18\sqrt{2}+2\sqrt{3}$ ⑤ $24\sqrt{2}+4\sqrt{3}$

해설

$$\sqrt{18}+\sqrt{48}-2\sqrt{27}+3\sqrt{50}$$
$$=3\sqrt{2}+4\sqrt{3}-6\sqrt{3}+15\sqrt{2}$$
$$=\left(3\sqrt{2}+15\sqrt{2}\right)+\left(4\sqrt{3}-6\sqrt{3}\right)$$
$$=18\sqrt{2}-2\sqrt{3}$$

**19.** $\sqrt{45}+\sqrt{80}-k\sqrt{5}=0$ 일 때, 유리수 $k$의 값은?

① 5 ② 6 ③ 7 ④ 8 ⑤ 9

해설

$3\sqrt{5}+4\sqrt{5}-k\sqrt{5}=0$

$7\sqrt{5}=k\sqrt{5}$

$\therefore k=7$

**20.** $\sqrt{2}=a$ , $\sqrt{3}=b$ 라고 할 때, $\sqrt{8}+2\sqrt{27}+\dfrac{6}{\sqrt{54}}-\dfrac{3}{\sqrt{18}}$ 을 $a$ ,$b$ 를 이용하여 나타내면?

① $\dfrac{1}{2}a+6b+\dfrac{1}{3}ab$

② $\dfrac{3}{2}a+6b+\dfrac{1}{3}ab$

③ $\dfrac{5}{2}a+6b+\dfrac{1}{3}ab$

④ $\dfrac{1}{2}a+4b+\dfrac{1}{3}ab$

⑤ $\dfrac{3}{2}a+4b+\dfrac{1}{3}ab$

해설

$$
\begin{aligned}
(\text{준식}) &= 2\sqrt{2}+6\sqrt{3}+\frac{6}{3\sqrt{6}}-\frac{3}{3\sqrt{2}} \\
&= 2\sqrt{2}+6\sqrt{3}+\frac{\sqrt{6}}{3}-\frac{\sqrt{2}}{2} \\
&= \frac{3}{2}\sqrt{2}+6\sqrt{3}+\frac{1}{3}\sqrt{2}\sqrt{3} \\
&= \frac{3}{2}a+6b+\frac{1}{3}ab
\end{aligned}
$$

**21.** $\dfrac{1}{\sqrt{12}} + \dfrac{3}{\sqrt{27}} - \sqrt{12} = A\sqrt{3}$ 일 때, 유리수 $A$ 의 값은?

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

해설

$$\frac{\sqrt{3}}{6} + \frac{\sqrt{3}}{3} - 2\sqrt{3} = \frac{3\sqrt{3}}{6} - \frac{12\sqrt{3}}{6}$$

$$= -\frac{9\sqrt{3}}{6}$$

$$= -\frac{3\sqrt{3}}{2} \text{ 이다.}$$

따라서 $A = -\dfrac{3}{2}$ 이다.

**22.** $\sqrt{32}-2\sqrt{24}-\sqrt{2}(1+2\sqrt{3})$을 간단히 하면?

① $3\sqrt{2}-6\sqrt{6}$ ② $3\sqrt{2}+2\sqrt{6}$ ③ $4\sqrt{2}-\sqrt{6}$

④ $4\sqrt{2}+3\sqrt{6}$ ⑤ $5\sqrt{2}+3\sqrt{6}$

해설

$$\begin{aligned}&\sqrt{32}-2\sqrt{24}-\sqrt{2}(1+2\sqrt{3})\\&=4\sqrt{2}-4\sqrt{6}-(\sqrt{2}+2\sqrt{6})\\&=4\sqrt{2}-4\sqrt{6}-\sqrt{2}-2\sqrt{6}\\&=3\sqrt{2}-6\sqrt{6}\end{aligned}$$

**23.** $A = \sqrt{2} - 5\sqrt{3}$ , $B = -3\sqrt{2} - \sqrt{3}$ 일 때, $\sqrt{3}A - \sqrt{2}B$ 의 값은?

① $2\sqrt{6} - 9$ ② $2\sqrt{6} + 9$ ③ $-21$

④ $-2\sqrt{6} + 21$ ⑤ $2\sqrt{6} - 21$

해설

$$\begin{aligned}
&\sqrt{3}A - \sqrt{2}B \\
&= \sqrt{3}(\sqrt{2} - 5\sqrt{3}) - \sqrt{2}(-3\sqrt{2} - \sqrt{3}) \\
&= \sqrt{6} - 15 + 6 + \sqrt{6} \\
&= 2\sqrt{6} - 9
\end{aligned}$$

**24.** $\sqrt{5}\left(\frac{4\sqrt{5}}{\sqrt{10}}+\frac{5}{\sqrt{9}}\right)+\frac{3+4\sqrt{2}}{\sqrt{5}}=a\sqrt{5}+b\sqrt{10}$ 일 때, $b-a$ 의 값은?

(단, $a$, $b$는 유리수)

① $\frac{1}{3}$ ② $\frac{2}{5}$ ③ $\frac{7}{15}$ ④ $\frac{8}{15}$ ⑤ $\frac{3}{5}$

해설

$$\sqrt{5}\left(\frac{4\sqrt{5}}{\sqrt{10}}+\frac{5}{\sqrt{9}}\right)+\frac{3+4\sqrt{2}}{\sqrt{5}}$$

$$=2\sqrt{10}+\frac{5\sqrt{5}}{3}+\frac{3\sqrt{5}+4\sqrt{10}}{5}$$

$$=2\sqrt{10}+\frac{4\sqrt{10}}{5}+\left(\frac{5}{3}+\frac{3}{5}\right)\sqrt{5}$$

$$=\frac{14\sqrt{10}}{5}+\frac{34}{15}\sqrt{5}$$

$$a=\frac{34}{15}, b=\frac{14}{5}$$

$$\therefore b-a=\frac{8}{15}$$

**25.** 연립방정식 $\begin{cases} \sqrt{2}x + \sqrt{3}y = 5\sqrt{6} \\ \sqrt{3}x - 2\sqrt{2}y = -2 \end{cases}$ 를 풀면?

① $x = \frac{17}{7}\sqrt{3},\ y = \frac{18}{7}\sqrt{2}$ ② $x = \frac{18}{7}\sqrt{2},\ y = \frac{17}{7}\sqrt{3}$

③ $x = \frac{17}{7}\sqrt{2},\ y = \frac{18}{7}\sqrt{3}$ ④ $x = \frac{18}{7}\sqrt{3},\ y = \frac{17}{7}\sqrt{2}$

⑤ $x = \frac{17}{7}\sqrt{3},\ y = \frac{18}{7}\sqrt{3}$

해설

$\begin{cases} \sqrt{2}x + \sqrt{3}y = 5\sqrt{6} \cdots ㉠ \\ \sqrt{3}x - 2\sqrt{2}y = -2 \cdots ㉡ \end{cases}$

㉠$\times 2\sqrt{2} +$ ㉡$\times \sqrt{3}$ 을 하면

$$\begin{array}{rl} & 4x + 2\sqrt{6}y = 20\sqrt{3} \\ + ) & 3x - 2\sqrt{6}y = -2\sqrt{3} \\ \hline & 7x = 18\sqrt{3} \end{array}$$

$\therefore x = \frac{18}{7}\sqrt{3}$

㉡에 $x = \frac{18}{7}\sqrt{3}$ 을 대입하면

$\frac{54}{7} - 2\sqrt{2}y = -2,\ \sqrt{2}y = \frac{34}{7}$

$y = \frac{17}{7}\sqrt{2}$