1. $A = \sqrt{81} + \sqrt{(-7)^2} \div \sqrt{\frac{49}{16}} - \left(-\sqrt{6}\right)^2$ 일 때, A^2 의 값은?

① 1 ② $\frac{6}{7}$ ③ 7 ④ $\frac{36}{49}$ ⑤ 49

해설

$A = 9 + 7 \div \frac{7}{4} - 6 = 9 + 4 - 6 = 7$

$\therefore A^2 = 49$

2. $\sqrt{32}+\dfrac{8}{\sqrt{2}}-\sqrt{50}=a\sqrt{2}$, $\sqrt{0.2}\times\sqrt{\dfrac{4}{5}}\times\sqrt{125}=b\sqrt{5}$ 일 때, $a-b$ 의 값은?

① -2 ② -1 ③ 1 ④ 2 ⑤ 3

해설

$4\sqrt{2}+4\sqrt{2}-5\sqrt{2}=3\sqrt{2}$ $\therefore$ $a=3$

$$\sqrt{\frac{20}{100}}\times\frac{2\sqrt{5}}{5}\times5\sqrt{5}=\frac{\sqrt{5}}{5}\times\frac{2\sqrt{5}}{5}\times5\sqrt{5}$$

$$=2\sqrt{5}$$

$\therefore$ $b=2$

$\therefore$ $a-b=1$

3. $x+y=5$, $xy=-3$ 일 때, $(x-y)^2$ 의 값은?

① 12 ② 13 ③ 25 ④ 31 ⑤ 37

해설

$$\begin{aligned}(x-y)^2 &= x^2-2xy+y^2 \\ &= x^2+2xy+y^2-4xy \\ &= (x+y)^2-4xy \\ &= 5^2-4\times(-3) \\ &= 25+12 \\ &= 37\end{aligned}$$

4. $a = 1.75,\ \ b = 0.25$ 일 때, $a^2 - 6ab + 9b^2$ 의 값을 구하면?

① 1 ② 2 ③ 3 ④ 4 ⑤ 5

해설

$$\begin{aligned} a^2 - 6ab + 9b^2 &= (a - 3b)^2 \\ &= (1.75 - 3 \times 0.25)^2 \\ &= 1^2 = 1 \end{aligned}$$

5. 두 실수 a, b 가 $a=\sqrt{7}-6$, $b=\sqrt{3}+\sqrt{7}$ 일 때, 다음 중 옳은 것은?

보기

㉠ $b-a>0$ ㉡ $a-b<0$ ㉢ $ab<0$

㉣ $a+3<0$ ㉤ $b-\sqrt{7}<2$

① ㉠ ② ㉠, ㉡

③ ㉡, ㉢, ㉤ ④ ㉠, ㉡, ㉢, ㉤

⑤ ㉠, ㉡, ㉢, ㉣, ㉤

해설

$$b-a=\sqrt{3}+\sqrt{7}-\left(\sqrt{7}-6\right)$$

㉠ $=\sqrt{3}+6$

$=\sqrt{36}+\sqrt{9}>0$

$\therefore\ b-a>0$

$$a-b=\sqrt{7}-6-\left(\sqrt{3}+\sqrt{7}\right)$$

㉡ $=-6-\sqrt{3}$

$=-\sqrt{36}-\sqrt{3}<0$

$\therefore\ a-b<0$

㉢ $a=\sqrt{7}-6=\sqrt{7}-\sqrt{36}<0$

$b=\sqrt{3}+\sqrt{7}>0$

$\therefore\ ab<0$

㉣ $a+3=\left(\sqrt{7}-6\right)+3=\sqrt{7}-3=\sqrt{7}-\sqrt{9}<0$

$\therefore a+3<0$

㉤ (좌변)$=b-\sqrt{7}=\sqrt{3}+\sqrt{7}-\sqrt{7}=\sqrt{3}$

(우변)$=2=\sqrt{4}$

$\therefore b-\sqrt{7}<2$

6. $\left(-\sqrt{2}\right)^2 \times \left(\sqrt{\frac{3}{2}}\right)^2$ 을 계산하면?

① 3 ② -3 ③ 9 ④ -9 ⑤ $2\sqrt{3}$

해설

$2 \times \frac{3}{2} = 3$

7. $\sqrt{20}+\sqrt{0.2}+\dfrac{4}{\sqrt{5}}=a\sqrt{5}$, $\sqrt{2.5}\times\sqrt{\dfrac{6}{5}}\times\sqrt{18}=b\sqrt{6}$ 일 때, $a\times b$ 의 값은?

① 4 ② 9 ③ 16 ④ 25 ⑤ 36

해설

$$2\sqrt{5}+\frac{\sqrt{5}}{5}+\frac{4\sqrt{5}}{5}=\frac{10\sqrt{5}+\sqrt{5}+4\sqrt{5}}{5}=\frac{15\sqrt{5}}{5}=3\sqrt{5}$$

$\therefore a=3$

$$\sqrt{2.5}\times\sqrt{\frac{6}{5}}\times\sqrt{18}=\sqrt{\frac{25}{10}\times\frac{6}{5}\times18}=3\sqrt{6}$$

$\therefore b=3$

$\therefore a\times b=9$

8. 두 실수 a, b 가 $a = \sqrt{8} - 3$, $b = -\sqrt{7} + \sqrt{8}$ 일 때, 다음 중 옳은 것은?

① $a - b > 0$ ② $b - a < 0$ ③ $b + \sqrt{7} > 3$

④ $ab > 0$ ⑤ $a + 1 > 0$

해설

① $a - b = \sqrt{8} - 3 - \left(-\sqrt{7} + \sqrt{8}\right)$
$= \sqrt{7} - 3$
$= \sqrt{7} - \sqrt{9} < 0$
$\therefore\ a - b < 0$

② $b - a = -\sqrt{7} + \sqrt{8} - \left(\sqrt{8} - 3\right)$
$= -\sqrt{7} + 3$
$= \sqrt{9} - \sqrt{7} > 0$
$\therefore\ b - a > 0$

③ (좌변)$= b + \sqrt{7} = -\sqrt{7} + \sqrt{8} + \sqrt{7} = \sqrt{8}$
(우변)$= 3 = \sqrt{9}$
$\therefore\ b + \sqrt{7} < 3$

④ $a = \sqrt{8} - 3 = \sqrt{8} - \sqrt{9} < 0$
$b = \sqrt{8} - \sqrt{7} > 0$
$\therefore\ ab < 0$

⑤ $a + 1 = \left(\sqrt{8} - 3\right) + 1$
$= \sqrt{8} - 2$
$= \sqrt{8} - \sqrt{4} > 0$
$\therefore\ a + 1 > 0$

9. $x-\frac{1}{x}=1$ 일 때, $x^2-\frac{1}{x^2}$ 의 값은?

① $\pm\sqrt{5}$ ② ± 4 ③ ± 1 ④ 2 ⑤ -4

해설

$$\left(x+\frac{1}{x}\right)^2=\left(x-\frac{1}{x}\right)^2+4$$
$$=1+4$$
$$=5$$

$$x+\frac{1}{x}=\pm\sqrt{5}$$

$$x^2-\frac{1}{x^2}=\left(x-\frac{1}{x}\right)\left(x+\frac{1}{x}\right)$$
$$=1\times(\pm\sqrt{5})=\pm\sqrt{5}$$

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

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

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 $A = -\frac{3}{2}$ 이다.