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| Aa | 式 の 計 算 編 | 正 答 ・ 解 説 |
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| 正 答 |
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| 問題<br>番号 | 解 答 記 号                                                                  | 正 解                                    |
|----------|--------------------------------------------------------------------------|----------------------------------------|
| 1.       | ア                                                                        | 2                                      |
|          | イ(ウエ+ $\sqrt{\text{オ}}$ )                                                | $2(-1+\sqrt{6})$                       |
|          | カ(キ- $\sqrt{\text{ク}}$ )                                                 | $8(3-\sqrt{6})$                        |
|          | ケコ                                                                       | 16                                     |
|          | $a^4 + \text{サ } a^3 - \text{シス } a^2$<br>+ $\text{セ } a + \text{ソ} = 0$ | $a^4 + 4a^3 - 16a^2$<br>+ $8a + 4 = 0$ |

| 問題<br>番号 | 解 答 記 号                              | 正 解                  |
|----------|--------------------------------------|----------------------|
| 2.       | ア $x+y+\text{イ}$<br>ウ $x+y-\text{エ}$ | $2x+y+4$<br>$3x+y-5$ |
|          | オカキ                                  | -18                  |

# 解 説

1.

$$(1) \quad ab = \frac{1+\sqrt{3}}{1+\sqrt{2}} \cdot \frac{1-\sqrt{3}}{1-\sqrt{2}} = \frac{1-3}{1-2} = \frac{-2}{-1} = \underline{2}$$

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

$$\begin{aligned} a^2+b^2 &= (a+b)^2 - 2ab \\ &= \left\{ 2(-1+\sqrt{6}) \right\}^2 - 2 \cdot 2 \\ &= 4(1-2\sqrt{6}+6) - 4 \\ &= 4(7-2\sqrt{6}) - 4 \\ &= 28-8\sqrt{6}-4 \\ &= 24-8\sqrt{6} \\ &= \underline{8(3-\sqrt{6})} \end{aligned}$$

$$\begin{aligned} (2) \quad a^2+b^2+4(a+b) &= 8(3-\sqrt{6}) + 4 \cdot 2(-1+\sqrt{6}) \\ &= 8(3-\sqrt{6}) + 8(-1+\sqrt{6}) \\ &= 8(3-\sqrt{6}-1+\sqrt{6}) \\ &= 8 \times 2 \\ &= \underline{16} \end{aligned}$$

$$ab=2 \text{ より、 } b=\frac{2}{a}$$

$$a^2+b^2+4(a+b)=16 \text{ へ代入する。}$$

$$\begin{aligned} a^2 + \left( \frac{2}{a} \right)^2 + 4 \left( a + \frac{2}{a} \right) &= 16 \\ a^2 + \frac{4}{a^2} + 4a + \frac{8}{a} &= 16 \end{aligned}$$

両辺  $\times a^2$

$$\begin{aligned} a^4 + 4 + 4a^3 + 8a &= 16a^2 \\ a^4 + \underline{4a^3} - \underline{16a^2} + \underline{8a} + \underline{4} &= 0 \end{aligned}$$

$$2. \quad A = 6x^2 + 5xy + y^2 + 2x - y - 20$$

$$\begin{aligned} &= 6x^2 + (5y+2)x + y^2 - y - 20 \\ &= 6x^2 + (5y+2)x + (y+4)(y-5) \\ &= \{ 2x + (y+4) \} \{ 3x + (y-5) \} \\ &= (\underline{2x+y+4})(\underline{3x+y-5}) \end{aligned}$$

$$y = \frac{2}{3-\sqrt{7}} = \frac{2(3+\sqrt{7})}{9-7} = \frac{2(3+\sqrt{7})}{2} = 3+\sqrt{7}$$

$x=-1, y=3+\sqrt{7}$  を代入

$$\begin{aligned} A &= \{ 2 \cdot (-1) + (3+\sqrt{7}) + 4 \} \{ 3 \cdot (-1) + (3+\sqrt{7}) - 5 \} \\ &= (-2+3+\sqrt{7}+4)(-3+3+\sqrt{7}-5) \\ &= (5+\sqrt{7})(-5+\sqrt{7}) \\ &= -25+7 \\ &= \underline{-18} \end{aligned}$$