

1 (1) $(3-a)(3+a) = 9 - a^2$.

(2) $a^2 + 9a + 14 = (a+2)(a+7)$

(3) $(\sqrt{3}+3)(2\sqrt{3}-1) = 2 \cdot 3 - \sqrt{3} + 6\sqrt{3} - 3 = 3 + 5\sqrt{3}$.

(4) $(x-4)^2 = 2 \therefore x-4 = \pm\sqrt{2} \therefore x = 4 \pm \sqrt{2}$.

(5) $y = ax^2$, $x = 3$ のとき $y = 3$ より $3 = 9a$ よって $a = \frac{1}{3}$.

2 (6) $x:2 = 8:5$. よって $5x = 16$ $x = \frac{16}{5}$.

(7) $x:6 = 2:\sqrt{3}$. よって $\sqrt{3}x = 12$. $\therefore x = \frac{12}{\sqrt{3}} = 4\sqrt{3}$.

(8) $(a^2+a+2)^2 = (a^2+a+2)(a^2+a+2) = a^4+a^3+2a^2+a^3+a^2+2a+2a^2+2a+4 = a^4+2a^3+5a^2+4a+4$.

(9) $a^4 - 7a^2 - 18 = (a^2+2)(a^2-9) = (a^2+2)(a+3)(a-3)$.

(10) $\frac{1}{3-\sqrt{2}} - \frac{1}{3+\sqrt{2}} = \frac{3+\sqrt{2}}{(3-\sqrt{2})(3+\sqrt{2})} - \frac{3-\sqrt{2}}{(3+\sqrt{2})(3-\sqrt{2})} = \frac{3+\sqrt{2}-(3-\sqrt{2})}{9-2} = \frac{2\sqrt{2}}{7}$.

3 (11) $A \cap B = \{1, 7\}$.

(12) $(x, y) = (-9, -1), (-3, -3), (-1, -9), (1, 9), (3, 3), (9, 1)$. $\therefore 6$ 個.

(13) ${}_6C_3 \times {}_3C_2 \times {}_3C_2 = \frac{6 \cdot 5 \cdot 4}{3 \cdot 2 \cdot 1} \times \frac{3 \cdot 2}{2 \cdot 1} \times \frac{1}{1} = 60$.

(14) ① $y = (x-4)^2 - 11$ より $x = 4$ のとき最小値をとる.

② 最小値は -11 .

(15) ① $\cos^2 \theta = 1 - \sin^2 \theta = 1 - \left(\frac{1}{6}\right)^2 = \frac{35}{36}$. $90^\circ < \theta < 180^\circ$ より $\cos \theta < 0$. よって $\cos \theta = -\frac{\sqrt{35}}{6}$.

② $\tan \theta = \frac{\sin \theta}{\cos \theta} = \frac{\frac{1}{6}}{-\frac{\sqrt{35}}{6}} = -\frac{1}{\sqrt{35}} = -\frac{\sqrt{35}}{35}$.