

① (i) $3\sqrt{x}$ ⑤ (ii) $8x\sqrt{y}$ ⑤ (iii) $3\sqrt{3}$ ⑤

② $\frac{2}{\sqrt{3}+1} \cdot \frac{\sqrt{3}-1}{\sqrt{3}-1}$
 $= \frac{2\sqrt{3}-2}{3-1} = \frac{2\sqrt{3}-2}{2} = \boxed{\sqrt{3}-1}$ ⑩

③ (i) $16^{-\frac{3}{4}} = \frac{1}{16^{\frac{3}{4}}} = \frac{1}{(16^{\frac{1}{4}})^3} = \frac{1}{2^3} = \boxed{\frac{1}{8}}$ ⑩

(ii) $\left(\frac{8}{27}\right)^{\frac{1}{3}} = \frac{8^{\frac{1}{3}}}{27^{\frac{1}{3}}} = \boxed{\frac{2}{3}}$ ⑩

④ $\frac{(x^2y)^3(3xy^2)^2}{(6x^3y)(9x^4y^2)^{\frac{1}{2}}} = \frac{x^6y^3(9x^2y^4)}{6x^3y(3x^2y)} = \frac{9x^8y^7}{18x^5y^2}$
 $= \boxed{\frac{x^3y^5}{2}}$ ⑩

⑤ $4^{2x+3} = 128$

$\therefore (2^2)^{2x+3} = 2^7$

$\therefore 2^{4x+6} = 2^7$

$\therefore 4x+6 = 7$

$\therefore 4x = 1$

$\boxed{x = \frac{1}{4}}$ ⑩

$$\textcircled{6} \quad \frac{3^{2x}}{3^{4x}} = 243$$

$$\therefore 3^{2x-4x} = 3^5$$

$$\therefore 2x - 4x = 5$$

$$\therefore 2x - 4x - 5 = 0$$

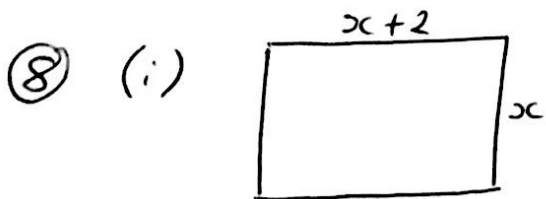
$$\therefore (x-5)(x+1) = 0$$

$$\boxed{x=5} \text{ or } \boxed{x=-1} \quad \textcircled{10}$$

$$\textcircled{7} \quad (x^2 - 2px + p^2)(x+k) = x^3 + qx + r$$

$$\therefore x^3 - 2px^2 + kx^2 - 2pkx + p^2x + p^2k = x^3 + qx + r$$

$$\begin{aligned} \therefore -2p + k &= 0 & \left. \begin{aligned} -2pk + p^2 &= q \\ -2p\left(\frac{r}{p^2}\right) + p^2 &= q \end{aligned} \right\} p^2k = r \\ \therefore -2p + \frac{r}{p^2} &= 0 & \therefore \boxed{k = \frac{r}{p^2}} \quad \textcircled{(i)} \\ \therefore -2p^3 + r &= 0 & \left. \begin{aligned} -2p\left(\frac{2p^3}{p^2}\right) + p^2 &= q \\ -2p(2p) + p^2 &= q \end{aligned} \right\} \\ \therefore \boxed{r = 2p^3} \quad \textcircled{(ii)} & & \therefore -4p^2 + p^2 = q \\ & & \therefore -3p^2 = q \\ & & \boxed{-3p^2 = q} \quad \textcircled{(iii)} \end{aligned} \quad \textcircled{15}$$



$$\begin{aligned} \text{Area} &= (x+2)(x) \\ &= \boxed{x^2 + 2x} \quad \textcircled{5} \end{aligned}$$

$$\begin{aligned} \text{(ii) Area} &= x(x-2) \\ &= \boxed{x^2 - 2x} \quad \textcircled{5} \end{aligned}$$

$$\begin{aligned} \text{(iii) Area} &= x^2 + 2x - (x^2 - 2x) \\ &= \boxed{4x} \quad \textcircled{5} \end{aligned}$$