

$$\textcircled{1} \quad \sqrt{48} = \sqrt{16} \sqrt{3} \quad \leftarrow$$
$$= \boxed{4\sqrt{3}} \quad \checkmark$$

$$\sqrt{48} = \sqrt{4} \sqrt{12}$$
$$= 2\sqrt{12}$$
$$= 2\sqrt{4} \sqrt{3}$$
$$= 2 \cdot 2 \sqrt{3} = \boxed{4\sqrt{3}} \quad \checkmark$$

② $\sqrt{175 y^2} = \sqrt{25 \cdot 7} \sqrt{y^2}$

$= 5y\sqrt{7}$

③ $(\underline{216} x^4 y^6 z^5)^{\frac{1}{2}} = \sqrt{216 x^4 y^6 z^5}$

$= \sqrt{\cancel{36} \cdot 6 x^4 y^6 z^5}$

$= 6 x^2 y^3 z^2 \sqrt{6z}$

Rule: $a^{\frac{1}{2}} = \sqrt{a}$ *

$a^{\frac{c}{b}}$ ← exponent
= $\sqrt[b]{a^c}$ ← index (root)

Ex: $x^{\frac{5}{3}}$ = $\sqrt[5]{x^3}$

$$\begin{aligned} \textcircled{4} \quad & 5\sqrt{3} - 2\sqrt{12} \\ &= 5\sqrt{3} - 2\sqrt{4}\sqrt{3} \\ &= 5\sqrt{3} - \underline{2}(\underline{2})\sqrt{3} \\ &= 5\sqrt{3} - 4\sqrt{3} \quad \textcircled{*} \\ &= \boxed{\sqrt{3}} \end{aligned}$$

$$\begin{aligned}
 \textcircled{5} \quad & 2 \times \sqrt{5} - 5 \sqrt{5x} + 7 \sqrt{5x^2} \\
 = & \underline{2} \times \sqrt{5} - 5 \sqrt{5x} + \underline{7} \times \sqrt{5} \\
 = & \boxed{9 \times \sqrt{5} - 5 \sqrt{5x}}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{6} \quad & \underline{3} \sqrt{72x^9y^3} = 3 \sqrt{36 \cdot 2x^9y^3} \\
 & = \underline{3} \cdot \underline{6} x^4 y \sqrt{2xy} \\
 & = \boxed{18x^4y \sqrt{2xy}}
 \end{aligned}$$

⑦

$$\sqrt[5]{b^3} = b^{3/5}$$

⑧

$$\begin{aligned} 4\sqrt{3} \cdot 7\sqrt{12} &= 28\sqrt{36} \\ &= 28(6) \\ &= 168 \end{aligned}$$

$$\textcircled{9} \quad \boxed{1} \sqrt{\underline{\underline{8x^3y^2}}} \cdot \boxed{5} \sqrt{\underline{\underline{3y^3}}}$$

$$= \boxed{5} \sqrt{\underline{\underline{24x^3y^5}}}$$

$$= 5 \sqrt{4} \sqrt{6} \sqrt{x^3y^5}$$

$$= 5 \underline{\underline{(2)}} x y^2 \sqrt{6xy}$$

$$= \boxed{10xy^2 \sqrt{6xy}}$$

⑩ $(-2 + \sqrt{5})(4 + \sqrt{3})$

$= -8 - 2\sqrt{3} + 4\sqrt{5} + \sqrt{15}$

⑪ $\sqrt{x-3} = 4$

$x-3 = 16$

$+3 \quad +3$

$x = 19$

* Check

$\sqrt{19-3} = 4$

$\sqrt{16} = 4$

$4 = 4 \checkmark$

⑫

$$\sqrt{2x-6} = \sqrt{x+5}$$

$$2x-6 = x+5$$

$$-x$$

-

$$-x$$

$$x - \cancel{6}$$

=

$$5$$

$$+ \cancel{6}$$

-

$$+ 6$$

$$x = 11$$

check

$$\sqrt{2(11)-6} =$$

$$\sqrt{22-6} = \sqrt{16}$$

$$\sqrt{16} = \sqrt{16}$$

$$4 = 4 \checkmark$$