

4

$$(x+10)(x-9) = 0$$

$$x+10=0$$

$$-10 \quad -10$$

$$\boxed{x = -10}$$

$$x-9=0$$

$$+9 \quad +9$$

$$\boxed{x = 9}$$

$$D: \{x \mid x \neq -10, 9\}$$

5

$$\frac{x^2 - 64}{a(\underline{x+8}) - b(\underline{x+8})} = \frac{(x-8)\cancel{(x+8)}}{\cancel{(x+8)}(a-b)} = \frac{x-8}{a-b}$$

10

$$x^2 + 9 = 0 \text{ NO SOLUTION}$$

$$D: \mathbb{R}$$

12

$$\frac{x^2 y^2 + 6xy - 72}{x^2 y^2 - 18xy + 72} = \frac{(xy+12)\cancel{(xy-6)}}{(xy-12)\cancel{(xy-6)}}$$

$$= \frac{xy+12}{xy-12}$$

$$\begin{array}{l} S=6 \\ P=-72 \\ \hline S=-18 \\ P=72 \end{array}$$

$$(17) \frac{10y}{10y} \cdot \frac{4}{3x} - \frac{5}{2xy} \cdot \frac{15}{15} + \frac{4}{5xy} \cdot \frac{6}{6} - \frac{7}{6x} \cdot \frac{5y}{5y}$$

$$\text{LCD} = \underline{\underline{30xy}}$$

$$= \frac{40y}{30xy} - \frac{75}{30xy} + \frac{24}{30xy} - \frac{35y}{30xy}$$

$$= \frac{\overbrace{40y} - \overbrace{75} + \overbrace{24} - \overbrace{35y}}{30xy} = \frac{5y - 51}{30xy}$$

$$3 = 3$$

$$2 = 2$$

$$5 = 5$$

$$6 = 2 \cdot 3$$

$$\hline \text{LCM} = 2 \cdot 3 \cdot 5 = \underline{\underline{30}}$$

$$\textcircled{18} \quad \frac{w}{w^2-49} + \frac{7}{w-7} \cdot \frac{w+7}{w+7}$$

$$w^2 - 49 = (w-7)(w+7)$$

$$w-7 = (w-7)$$

$$\hline \text{LCD} = (w-7)(w+7)$$

$$= \frac{w}{(w-7)(w+7)} + \frac{7 \cdot (w+7)}{(w-7)(w+7)}$$

$$= \frac{w + 7(w+7)}{(w-7)(w+7)}$$

$$= \frac{\overbrace{w} + \overbrace{7w} + 49}{(w-7)(w+7)}$$

$$= \frac{8w + 49}{(w-7)(w+7)}$$

20

$$\frac{7x^6y^7}{5a^4b^3} \cdot \frac{\cancel{3}a^7b^5}{\cancel{3}x^2y^4} = \frac{7}{5} \cdot \frac{x^6}{x^2} \cdot \frac{y^7}{y^4} \cdot \frac{a^7}{a^4} \cdot \frac{b^5}{b^3}$$

$$= \frac{7}{5} \cdot x^4 \cdot y^3 \cdot a^3 \cdot b^2$$

$$= \frac{7x^4y^3a^3b^2}{5}$$

25

$$\frac{7}{w-2} \cdot \frac{w+5}{w+5} + \frac{5}{w+5} \cdot \frac{w-2}{w-2}$$

$$\text{LCM} = (w-2)(w+5)$$

$$= \frac{7 \cdot (w+5)}{(w-2)(w+5)} + \frac{5 \cdot (w-2)}{(w-2)(w+5)}$$

$$= \frac{\overbrace{7w} + \overbrace{35} + \overbrace{5w} - \overbrace{10}}{(w-2)(w+5)} = \frac{12w + 25}{(w-2)(w+5)}$$

$$\begin{aligned}
 & \textcircled{28} \quad \frac{\left(\frac{7}{a^2} - \frac{1}{a}\right) \cdot a^2}{\left(\frac{7}{a^2} + \frac{1}{a}\right) \cdot a^2} \quad \begin{array}{l} a^2 \\ a^2 \end{array} \\
 & = \frac{\frac{7}{\cancel{a^2}} \cdot \cancel{a^2} - \frac{1}{\cancel{a}} \cdot \cancel{a^2}}{\frac{7}{\cancel{a^2}} \cdot \cancel{a^2} + \frac{1}{\cancel{a}} \cdot \cancel{a^2}} = \frac{7 - a}{7 + a} \\
 & = \frac{-a + 7}{a + 7} = \frac{-(a - 7)}{a + 7} \\
 & = -\frac{a - 7}{a + 7}
 \end{aligned}$$

30

$$\frac{\left(1 + \frac{7}{x}\right)}{\left(1 - \frac{49}{x^2}\right)} \cdot \frac{x^2}{x^2}$$

x

x²

$$= \frac{1 \cdot x^2 + \frac{7}{x} \cdot x^2}{1 \cdot x^2 - \frac{49}{x^2} \cdot x^2} = \frac{x^2 + 7x}{x^2 - 49}$$

$$= \frac{x(x+7)}{(x-7)(x+7)} = \frac{x}{x-7}$$

26

$$\frac{x+1}{x^2+x-20} - \frac{x+4}{x^2+6x+5}$$

$$x^2 + x - 20 = (x+5)(x-4)$$

$$S=1$$

$$P=-20$$

$$x^2 + 6x + 5 = (x+5)(x+1)$$

$$S=6$$

$$P=5$$

$$LCD = (x+5)(x-4)(x+1)$$

$$= \frac{x+1}{(x+5)(x-4)} \cdot \frac{x+1}{x+1} - \frac{x+4}{(x+5)(x+1)} \cdot \frac{x-4}{x-4}$$

$$= \frac{(x+1)(x+1)}{(x+5)(x-4)(x+1)} - \frac{(x+4)(x-4)}{(x+5)(x-4)(x+1)}$$

$$= \frac{x^2 + 2x + 1}{(x+5)(x-4)(x+1)} - \frac{x^2 - 16}{(x+5)(x-4)(x+1)}$$

$$= \frac{\cancel{x^2} + 2x + 1 - \cancel{x^2} + 16}{(x+5)(x-4)(x+1)} = \frac{2x + 17}{(x+5)(x-4)(x+1)}$$

32

$$a - \left(\frac{a}{10 - \frac{a}{10-a}} \right) \cdot \frac{(10-a)}{(10-a)}$$

$\frac{1}{10-a}$

$$= a - \frac{a \cdot (10-a)}{10 \cdot (10-a) - \frac{a}{(10-a)} \cdot (10-a)}$$

$$= a - \frac{10a - a^2}{100 - 10a - a}$$

$$= \frac{a}{1} - \frac{10a - a^2}{100 - 11a}$$

$$= \frac{a \cdot (100 - 11a)}{100 - 11a} - \frac{10a - a^2}{100 - 11a}$$

$$= \frac{100a - 11a^2 - 10a + a^2}{100 - 11a} = \frac{90a - 10a^2}{100 - 11a} = \frac{10(9a - a^2)}{100 - 11a}$$

36 $(x^2 y^{-\frac{1}{2}})^{-2} (x^{-8} y^2)^{\frac{1}{4}}$

$$-8 \cdot \frac{1}{4} \quad 2 \cdot \frac{1}{2}$$

$$= x^{-4} y^1 \cdot x^{-2} y^{\frac{1}{2}}$$

$$= x^{-6} y^{\frac{3}{2}}$$

$$= \frac{y^{\frac{3}{2}}}{x^6}$$

35 $(x^{-\frac{1}{5}} \cdot x^{\frac{3}{4}})^{-\frac{5}{3}}$

$$-\frac{1}{5} \cdot \frac{4}{3} + \frac{3}{4} \cdot \frac{5}{3}$$

$$-\frac{4}{20} + \frac{15}{20} = \frac{-4+15}{20} = \frac{11}{20}$$

$$= (x^{\frac{11}{20}})^{-\frac{5}{3}}$$

$$= x^{\frac{11}{20} \cdot \frac{5}{3}} = x^{-\frac{11}{12}}$$

$$= \frac{1}{x^{\frac{11}{12}}}$$

$$\begin{aligned} \textcircled{33} \quad (-4)^{3/2} &= \sqrt{(-4)^3} \\ &= \sqrt{-64} \quad \text{NOT POSSIBLE} \end{aligned}$$

$$\begin{aligned} \textcircled{38} \quad (a^{10} b)^{10/11} &= \sqrt[11]{(a^{10} \cdot b)^{10}} \\ &= \underline{\underline{\sqrt[11]{a^{100} \cdot b^{10}}}} \end{aligned}$$

$$\begin{aligned} \textcircled{45} \quad (x^{-2/3} \cdot y^{1/3})^{-7/4} &= x^{-\frac{2}{3} \cdot -\frac{7}{4}} \cdot y^{\frac{1}{3} \cdot -\frac{7}{4}} \\ &= x^{\frac{7}{6}} \cdot y^{-\frac{7}{12}} \\ &= \frac{x^{7/6}}{y^{7/12}} \end{aligned}$$

$$(46) \quad (49m^{-2}n^4)^{-1/2} \cdot (m \cdot n^{1/2})$$

$$= 49^{-1/2} \cdot m^{-2 \cdot -\frac{1}{2}} \cdot n^{4 \cdot -\frac{1}{2}} \cdot (m \cdot n^{1/2})$$

$$= 49^{-1/2} \cdot m^1 \cdot n^{-2} \cdot m \cdot n^{1/2}$$

$$= 49^{-1/2} m^2 n^{-3/2}$$

$$\left(= \frac{m^2}{49^{1/2} \cdot n^{3/2}} \right)$$

$$= \frac{m^2}{7 \cdot n^{3/2}}$$

$$\frac{2}{2} \cdot -\frac{2}{2} + \frac{1}{2}$$

$$-\frac{4}{2} + \frac{1}{2} = \frac{-4+1}{2} = -\frac{3}{2}$$

$$49^{1/2} = \sqrt{49} = 7$$

$$(41) \quad \sqrt[3]{-64x^{15}y^9} = \sqrt[3]{-64} \cdot \sqrt[3]{x^{15}} \cdot \sqrt[3]{y^9}$$

$$= \sqrt[3]{(-4)^3} \cdot x^{\frac{15}{3}} \cdot y^{\frac{9}{3}}$$

$$= \underline{\underline{(-4) \cdot x^5 y^3}}$$

$$\begin{aligned} \textcircled{56} \quad \sqrt{\frac{x}{20}} &= \frac{\sqrt{x}}{\sqrt{20}} \cdot \frac{\sqrt{20}}{\sqrt{20}} = \frac{\sqrt{x} \cdot \sqrt{20}}{20} \\ &= \frac{\sqrt{x} \cdot 2\sqrt{5}}{20} \\ \sqrt{20} &= \sqrt{4 \cdot 5} = \sqrt{4} \cdot \sqrt{5} = 2\sqrt{5} \\ &= \frac{\sqrt{5x}}{10} \end{aligned}$$

$$\begin{aligned} \textcircled{52} \quad \sqrt[5]{-32 \cdot a^{30} b^{25}} &= \sqrt[5]{-32} \cdot \sqrt[5]{a^{30}} \cdot \sqrt[5]{b^{25}} \\ &= \sqrt[5]{(-2)^5} \cdot a^{\frac{30}{5}} \cdot b^{\frac{25}{5}} \\ &= (-2) \cdot a^6 \cdot b^5 \end{aligned}$$

$$\begin{aligned} \textcircled{53} \quad \sqrt[3]{a^{16} b^8} &= \sqrt[3]{a^{15}} \cdot \sqrt[3]{a} \cdot \sqrt[3]{b^6} \cdot \sqrt[3]{b^2} \\ &= \sqrt[3]{a^{15} \cdot a} \cdot \sqrt[3]{b^6 \cdot b^2} \\ &= \sqrt[3]{a^{15}} \cdot \sqrt[3]{a} \cdot \sqrt[3]{b^6} \cdot \sqrt[3]{b^2} \\ &= a^{\frac{15}{3}} \cdot \sqrt[3]{a} \cdot b^{\frac{6}{3}} \cdot \sqrt[3]{b^2} \\ &= a^5 \cdot b^2 \cdot \sqrt[3]{ab^2} \end{aligned}$$

$$(54) \quad \sqrt[3]{x^2 y} \cdot \sqrt[3]{81 x^4 y^2}$$

$$= \sqrt[3]{x^2 \cdot y \cdot 81 \cdot x^4 \cdot y^2}$$

$$= \sqrt[3]{81 \cdot x^6 y^3} = \sqrt[3]{81} \cdot \sqrt[3]{x^6} \cdot \sqrt[3]{y^3}$$

$$= \sqrt[3]{27 \cdot 3} \cdot x^{\frac{6}{3}} \cdot y$$

$$= \underline{\underline{3^3 \sqrt{3} \cdot x^2 y}}$$

$$(60) \quad 8a \sqrt[4]{16ab^5} + 3b \sqrt[4]{256a^5b}$$

$$\begin{aligned} \sqrt[4]{16ab^5} &= \sqrt[4]{16} \cdot \sqrt[4]{a} \cdot \sqrt[4]{b^5} \\ &= \sqrt[4]{2^4} \cdot \sqrt[4]{a} \cdot \sqrt[4]{b^4} b \\ &= \underline{\underline{2b \sqrt[4]{ab}}} \end{aligned}$$

$$\begin{aligned} \sqrt[4]{256a^5b} &= \sqrt[4]{256} \cdot \sqrt[4]{a^5} \cdot \sqrt[4]{b} \\ &= \sqrt[4]{2^8} \cdot \sqrt[4]{a^4} a \cdot \sqrt[4]{b} \\ &= \underline{\underline{4a \sqrt[4]{ab}}} \end{aligned}$$

$$= \underline{8a \cdot 2b} \sqrt[4]{ab'} + \underline{3b \cdot 4a} \sqrt[4]{ab'}$$

$$= \underline{16ab} \sqrt[4]{ab'} + \underline{12ab} \sqrt[4]{ab'}$$

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$$= \underline{\underline{28ab}} \sqrt[4]{ab'}$$