

Exp Simplify ① $(2x^2 - 4x) \div 2x$

$$= \frac{2x^2 - 4x}{2x}$$

$$= \frac{\cancel{2}(x^2 - 2\cancel{x})}{\cancel{2}x}$$

$$= \frac{\cancel{x}(x - 2)}{\cancel{x}}$$

$$= x - 2$$

② $\frac{6x^2 - 6}{x^2 + 3x + 2} \div \frac{x - 1}{x^2 + 4x + 4}$

$$\frac{6x^2 - 6}{x^2 + 3x + 2} \cdot \frac{x^2 + 4x + 4}{x - 1}$$

$$\frac{(6x^2 - 6)(x^2 + 4x + 4)}{(x^2 + 3x + 2)(x - 1)}$$

$$\frac{6(x^2 - 1)(x + 2)(x + 2)}{(x + 2)(x + 1)(x - 1)} = \frac{6\cancel{(x - 1)}\cancel{(x + 1)}(x + 2)}{\cancel{(x + 1)}\cancel{(x - 1)}} = 6(x + 2)$$

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③ $x \cdot \frac{3x}{a^2} + \frac{4}{ax} \cdot a = \frac{3x+4}{a^2+ax}$

توحيد مقامات

$$\frac{3x^2}{xa^2} + \frac{4a}{a^2x} = \frac{3x^2+4a}{a^2x}$$

not LCD $\leftarrow \frac{ax \cdot \frac{3x}{a^2}}{ax \cdot a^2} + \frac{4 \cdot a^2}{ax \cdot a^2}$

$\frac{a^3x}{a^3x} + \frac{a^3x}{a^3x}$

LCD: least common denominator

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

$$= \frac{2x-x-2}{(x+1)(x-2)}$$

$$= \frac{\cancel{x}-2}{(x+1)\cancel{(x-2)}}$$

$$= \frac{1}{x+1}$$

⑤ $\frac{x}{x+1} - \frac{x}{1} + \frac{1}{1}$

$$\frac{x}{x+1} - \frac{x(x+1)}{x+1} + \frac{x+1}{x+1}$$

→ LCD = x+1

$$\frac{x}{x+1} - \frac{x(x+1)}{x+1} + \frac{x+1}{x+1} \rightarrow \boxed{LCD = x+1}$$

$$\frac{x - x(x+1) + x+1}{x+1}$$

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

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

⑥ $\frac{y-3}{(y-5)^2} - \frac{y-2}{y^2-4y-5}$

$$\frac{y+1}{(y+1)} \cdot \frac{y-3}{(y-5)^2} - \frac{y-2}{(y+1)(y-5)} \cdot \frac{(y-5)}{(y-5)}$$

$$\frac{(y+1)(y-3)}{(y+1)(y-5)^2} - \frac{(y-2)(y-5)}{(y+1)(y-5)^2} \rightarrow \text{LCD}$$

$$\frac{(y+1)(y-3) - (y-2)(y-5)}{(y+1)(y-5)^2}$$

$$\frac{y^2 - 2y + y - 3 - (y^2 - 5y - 2y + 10)}{(y+1)(y-5)^2} = \frac{-7y - 7}{(y+1)(y-5)^2}$$

~~$$\frac{AB+CD}{AD}$$~~

$$\frac{AB}{AD} = \frac{B}{D} \checkmark$$

$$\frac{y^2 - 3y + y - 3}{(y+1)(y-5)^2} = \frac{y^2 - 5y - 2y + 10}{(y+1)(y-5)^2}$$

$$\frac{5y - 13}{(y+1)(y-5)^2} \quad \checkmark$$

Fraction 


مقام

Complex fraction 

$$\frac{\text{Fraction}}{\text{Fraction}}$$

Exp Fraction $\rightarrow \frac{7x + 5}{2x}$

complex fraction $\frac{7x - 5}{2x + \frac{x}{8}}$

⑦
complex fraction

$$\frac{x + y}{\frac{1}{x} + \frac{1}{y}} = \frac{x + y}{\frac{y \cdot 1}{x} + \frac{1 \cdot x}{y}}$$

complex fraction

$$\frac{1}{x} + \frac{1}{y}$$

$$\frac{y \cdot \frac{1}{x}}{y \cdot x} + \frac{\frac{1}{y} \cdot x}{y \cdot x}$$

$$LCD = xy$$

$$= \frac{x+y}{\frac{y+x}{xy}} \div$$

$$= \frac{x+y}{1} \cdot \frac{xy}{y+x}$$

$$\frac{A}{B} \cdot \frac{C}{D} = \frac{AC}{BD}$$

$$\frac{(7+2) \cdot (10)}{(7+2)}$$

$$= \frac{(x+y) \cdot (xy)}{(y+x)} = xy$$

$$(8) \left(2^{-2} - 3^{-1} \right)^{-1} = \frac{1}{\left(2^{-2} - 3^{-1} \right)^1} = \frac{1}{\frac{1}{2^2} - \frac{1}{3}}$$

$$\begin{pmatrix} -2 & -1 \\ 2 & 3 \end{pmatrix} = 2 \cdot 3 = 6$$

$$\begin{pmatrix} 2 & 1 \\ 2 & 3 \end{pmatrix}$$

$$LCD = 12$$

$$= \frac{1}{\frac{3 \cdot \frac{1}{4}}{3 \cdot \frac{1}{4}} - \frac{1 \cdot 4}{3 \cdot 4}}$$

$$= \frac{1}{\frac{3}{12} - \frac{4}{12}}$$

$$= \frac{1}{-1} \div$$

$$= \frac{1}{\frac{-1}{12}} \div$$

$$= 1 \cdot \frac{12}{-1}$$

$$= -12$$

Exp Rationalize the denominator of

$$\textcircled{1} \frac{1-\sqrt{x}}{1+\sqrt{x}} \quad \textcircled{2} \frac{1-\sqrt{x}}{1-\sqrt{x}}$$

$1-\sqrt{x}$ conjugate of $1+\sqrt{x}$

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

$$= \frac{(1-\sqrt{x})^2}{1-x}$$

$$x^2 - 9 = (x-3)(x+3)$$

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

$$x^2 - 1 = (x-1)(x+1)$$

$$x-1 = (\sqrt{x}-1)(\sqrt{x}+1)$$

$$1-x = (1-\sqrt{x})(1+\sqrt{x})$$

$$x-4 = (\sqrt{x}-2)(\sqrt{x}+2)$$

$$\textcircled{2} \frac{1}{\sqrt{x}-2} \cdot \frac{\sqrt{x}+2}{\sqrt{x}+2}$$

$$\frac{\sqrt{x}+2}{x-4}$$

المقام خالي من الجذور

ب

Exp Rationalize the numerator of

$$\textcircled{1} \quad \frac{2 + \sqrt{x}}{\sqrt{x}} \cdot \frac{2 - \sqrt{x}}{2 - \sqrt{x}}$$

فأبقي من الجذر → $\frac{4 - x}{\sqrt{x}(2 - \sqrt{x})} = \frac{4 - x}{2\sqrt{x} - x}$