$$\frac{1}{2} \times \frac{3}{5} = \frac{5+6}{10} = \boxed{\frac{11}{10}} \checkmark$$

→ Common denominator. (LCM).
→ rewrite each in the new form.
→ add or subt
→ Simplify.

$$\frac{3}{7} \searrow \frac{8}{9} = \frac{27-56}{63} = \boxed{\frac{29}{63}} \checkmark$$

$$\frac{1}{(x+1)} \times \frac{3}{(x+4)} = \frac{(x+4)+3(x+1)}{(x+1)(x+4)} =$$

$$= \frac{x+4+3x+3}{(x+1)(x+4)}.$$

$$= \boxed{\frac{4x+7}{(x+1)(x+4)}}.$$

$$x \neq -1, -4$$

$$\frac{a}{b} \pm \frac{c}{d} = \frac{ad \pm bc}{bd}$$

$$\frac{1}{(x+1)} - \frac{2}{(x+1)^2} \quad \Big| \quad + \frac{3}{x-1}$$

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

$$\frac{\cancel{(x+1)}^1 \left((x+1) - 2\right)}{(x+1)^{\cancel{3}2}} \quad \frac{x+1-2}{(x+1)^2} \quad + \frac{3}{x-1}$$

$$\frac{\cancel{A}}{A^{\cancel{3}}} = \frac{1}{A^2}$$

$$\frac{\cancel{A}}{\cancel{A}A^2} = \frac{1}{A^2}$$

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

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

Special product.

$$(a+b)^2 = (a+b)(a+b) = a^2 + ab + ab + b^2$$
$$= a^2 + 2ab + b^2.$$

$$x^2 = x\,x$$

$$= \frac{x^2 - 2x + 1 + 3(x^2 + 2x + 1)}{(x+1)^2 (x-1)}.$$

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

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

$$= \boxed{\frac{4(x^2 + x + 1)}{(x+1)^2 (x-1)}.}$$

Simplify.

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

$$= \frac{(x+y)(x-y)}{xy} \cdot \frac{x^2 y^2}{(y+x)(y-x)} = \frac{(x^2 - y^2)}{xy} \cdot \frac{x^2 y^2}{(y^2 - x^2)} = -xy.$$

$$= -xy$$

$$\frac{\frac{x}{y} - \frac{y}{x}}{\frac{y}{x} - \frac{x}{y}} = -1$$

$$\frac{a - b}{b - a} = -1$$

Pop Quiz   Simplify

$(a+b)^2 = a^2 + 2ab + b^2$

$(a-b)^2 = a^2 - 2ab + b^2$

$a^2 - b^2 = (a+b)(a-b)$

$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$

$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$

$*\quad \dfrac{y^2 + y}{y^2 - 1} = \left(\dfrac{y}{y-1}\right)$

$\dfrac{y(y+1)}{(y+1)(y-1)} = \boxed{\dfrac{y}{y-1}}$

$\dfrac{\cancel{a}}{\cancel{a}+b} = \dfrac{1}{b}$

$*\quad \dfrac{1 - x^2}{x^3 - 1} = \dfrac{(1-\cancel{x})(1+x)}{(\cancel{x-1})(x^2+x+1)} = \boxed{\dfrac{-(1+x)}{x^2+x+1}}$

$(a-b)(a^2 + ab + b^2) = a^3 - b^3$

$a^3 + \cancel{a^2 b} + \cancel{ab^2} - \cancel{a^2 b} - \cancel{ab^2} - b^3 =$