

Algebra 2

Ch. 9 Handout 9.5

Adding/Subtracting Rational Expressions

Simplify each expression.

$$8. \frac{2x}{x^2-2x-3} - \frac{3}{4x+4}$$

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

$$\frac{8x}{4(x-3)(x+1)} - \frac{3x-9}{4(x-3)(x+1)}$$

$$\frac{(8x) - (3x-9)}{4(x-3)(x+1)} = \frac{8x-3x+9}{4(x-3)(x+1)}$$

$$= \boxed{\frac{5x+9}{4(x-3)(x+1)}}$$

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Simplify each expression.

$$9. \frac{1}{u^2-u} - \frac{1}{u^2-4}$$

$$\frac{1(u-2)(u+2)}{u(u-1)(u+2)} - \frac{1(u-1)}{u(u-1)(u-2)(u+2)}$$

$$\frac{(u-2)(u+2)}{u(u-1)(u+2)} - \frac{u(u-1)}{u(u-1)(u-2)(u+2)}$$

$$\frac{(u^2-4) - (u^2-u)}{u(u-1)(u-2)(u+2)}$$

$$\frac{\cancel{u^2}-4-\cancel{u^2}+u}{u(u-1)(u-2)(u+2)} = \boxed{\frac{u-4}{u(u-1)(u-2)(u+2)}}$$

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Simplify each expression.

$$10. (x-y)^{-1} - (x+y)^{-1}$$

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

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

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

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Simplify each expression.

$$11. \frac{1}{a^2+2a+1} - \frac{1}{a^2-1}$$

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

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

$$\frac{(a-1) - (a+1)}{(a+1)^2(a-1)} = \frac{a-1-a-1}{(a+1)^2(a-1)} = \boxed{\frac{-2}{(a+1)^2(a-1)}}$$

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