

ADDING AND
SUBTRACTING
RATIONAL
EXPRESSIONS



SECTION 11.6

How to add/subtract



1. Find a common denominator
2. Multiply the fractions by the missing term to get the bottoms the same
3. Add/subtract
4. Simplify

Examples



$$1. \frac{5}{12x} + \frac{7}{3x} \cdot \frac{4}{4}$$

$$\frac{5}{12x} + \frac{28}{12x} = \frac{33}{12x}$$

$$= \frac{11}{4x}$$

$$2. \frac{2x}{9x^2} - \frac{4}{3x} \cdot \frac{3x}{3x}$$

$$\frac{2x}{9x^2} - \frac{12x}{9x^2} = \frac{-10x}{9x^2}$$

$$= \frac{-10}{9x}$$

Examples



$$\frac{2x^3 \cdot 4x^2}{2x^3 \cdot 3x} + \frac{5x}{6x^4}$$

$$\frac{8x^5}{6x^4} + \frac{5x}{6x^4}$$

$$\frac{8x^5 + 5x}{6x^4} = \frac{x(8x^4 + 5)}{6x^4}$$

$$= \frac{(8x^4 + 5)}{6x^3}$$

$$\frac{4 \cdot 6x^2}{2 \cdot 2x^5} + \frac{1 \cdot x^3}{4x^2 \cdot x^3}$$

$$= 4x^5$$

$$\frac{12x^2}{4x^5} + \frac{x^3}{4x^5} = \frac{12x^2 + x^3}{4x^5}$$

$$\frac{x^2(12+x)}{4x^5} = \frac{(12+x)}{4x^3}$$

Examples

$$\begin{array}{l} -15x^2 + 8x - 16 \\ x^2 + 8x + 240 \end{array}$$

5. $\frac{3 \cdot 3x}{3(x+2)} + \frac{5(x+2)}{3(x+2)}$

$$\frac{9x}{3(x+2)} + \frac{5x+10}{3(x+2)}$$

$$\frac{14x+10}{3(x+2)} = \boxed{\frac{2(7x+5)}{3(x+2)}}$$

6. $\frac{8}{3x} - \frac{5x}{(x-2)} \cdot \frac{3x}{3x}$

$$\frac{8x-16}{3x(x-2)} - \frac{15x^2}{3x(x-2)}$$

$$\frac{8x-16-15x^2}{3x(x-2)} = \boxed{\frac{-15x^2+8x-16}{3x(x-2)}}$$

Examples

$$x^2 - 2x + x - 2$$

7. $\frac{3(x+2)}{(x+2)(x-3)} + \frac{-4(x-3)}{(x+2)(x-3)}$

$$\frac{3x+6}{(x+2)(x-3)} + \frac{-4x+12}{(x+2)(x-3)}$$

$$\frac{(-x+18)}{(x+2)(x-3)}$$

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

$$\frac{x^2-x-2}{(x-2)(x-1)} + \frac{3x^5-3x^4}{(x-2)(x-1)}$$

$$\frac{3x^5-3x^4+x^2-x-2}{(x-2)(x-1)}$$

Classwork



Pg 679 # 4-9

$$\textcircled{6} \frac{x}{x^2-9} - \frac{(3x+1)}{x^2-9} = \frac{x+(-3x-1)}{x^2-9} = \boxed{\frac{-2x-1}{(x-3)(x+3)}}$$

$$\textcircled{7} \frac{3 \cdot 4 + 1 \cdot 10}{10x^2 + 4x^2 \cdot 10} = \frac{12x}{40x^2} - \frac{10}{40x^2} = \frac{12x-10}{40x^2} = \frac{2(6x-5)}{40x^2} = \frac{6x-5}{20x^2}$$

Homework



Pg 679 # 7-19

Pg 682 # 1-8