Rational Functions

Objective: To apply the properties of rational functions to solve for a variable

How would you solve:

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Rational Functions ⇒ Fractions

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

SAME Denominator

$\frac{5}{8} + \frac{7}{8} = \frac{5+7}{8} = \frac{12}{8} = \frac{3}{2}$

same

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

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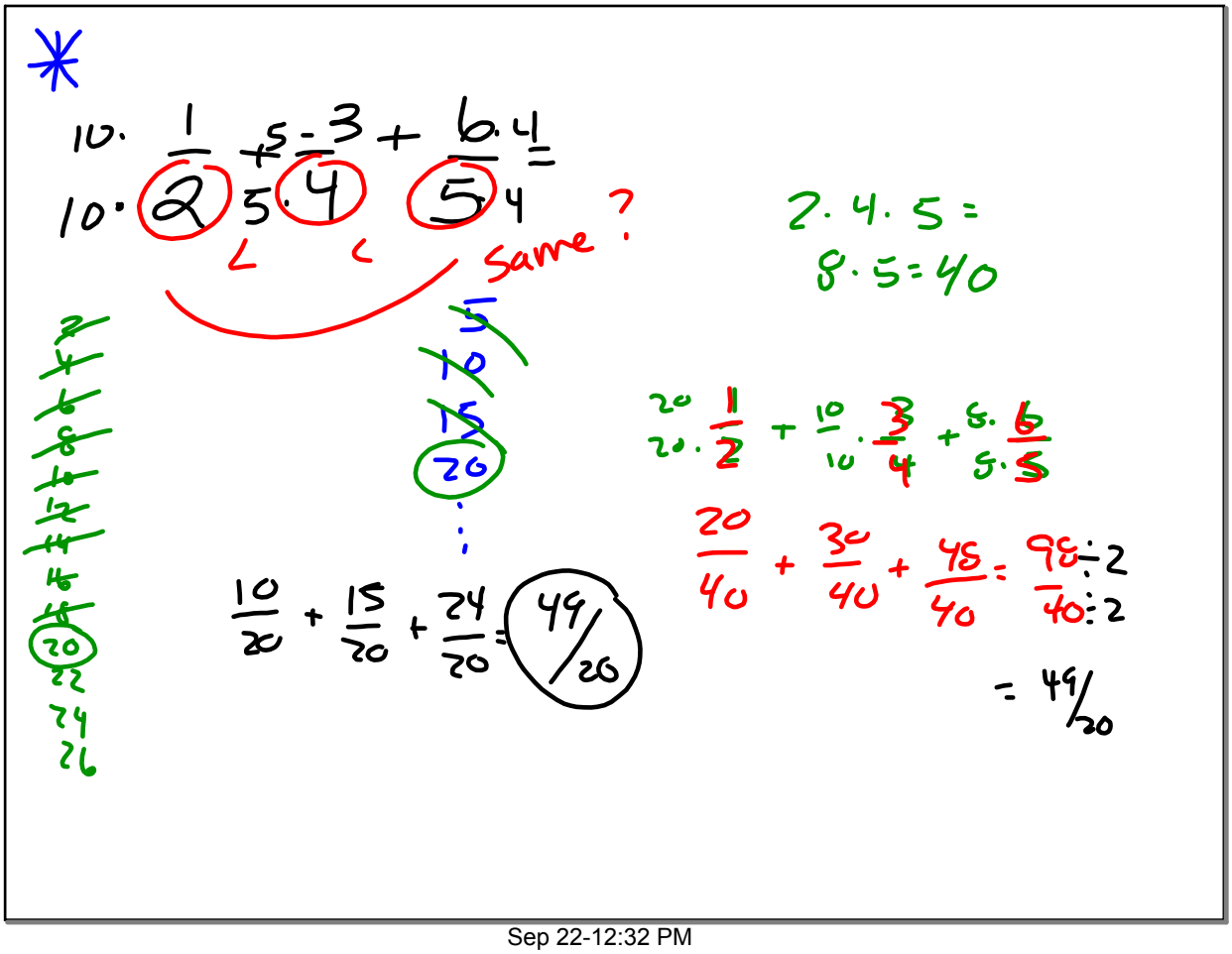

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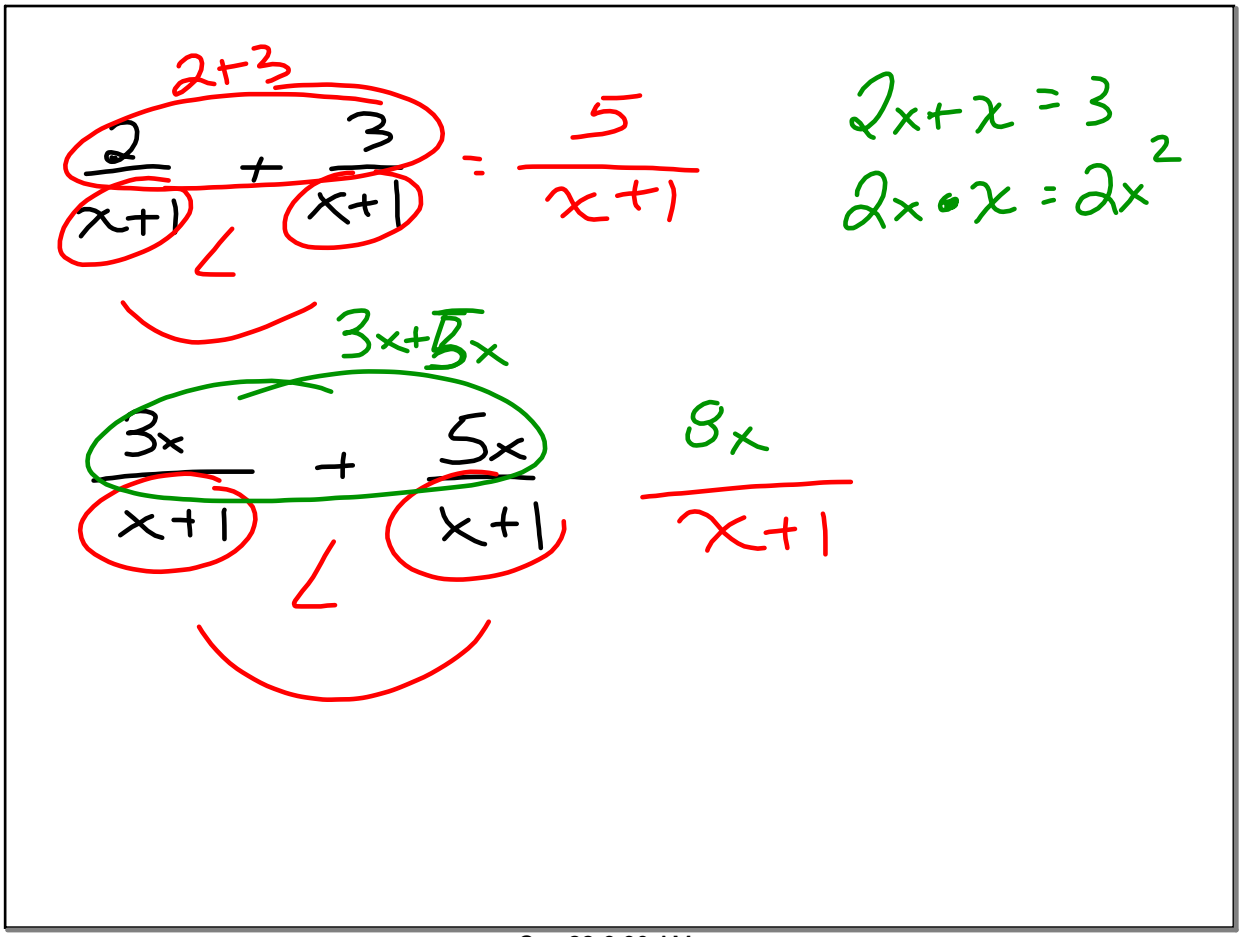

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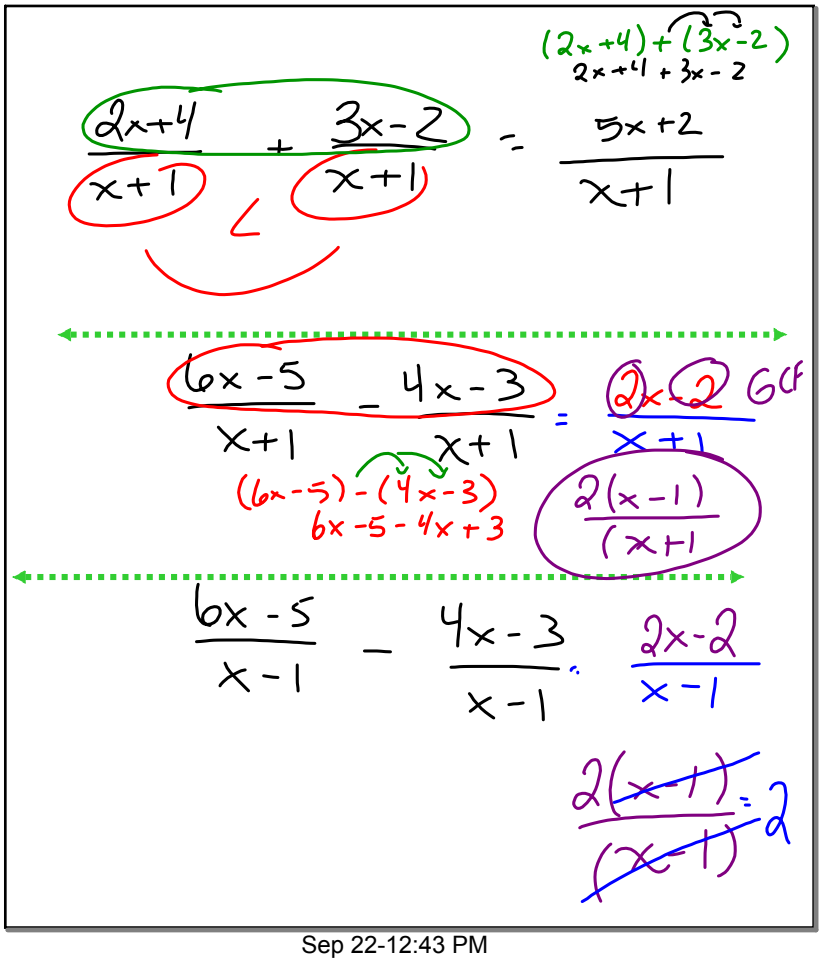

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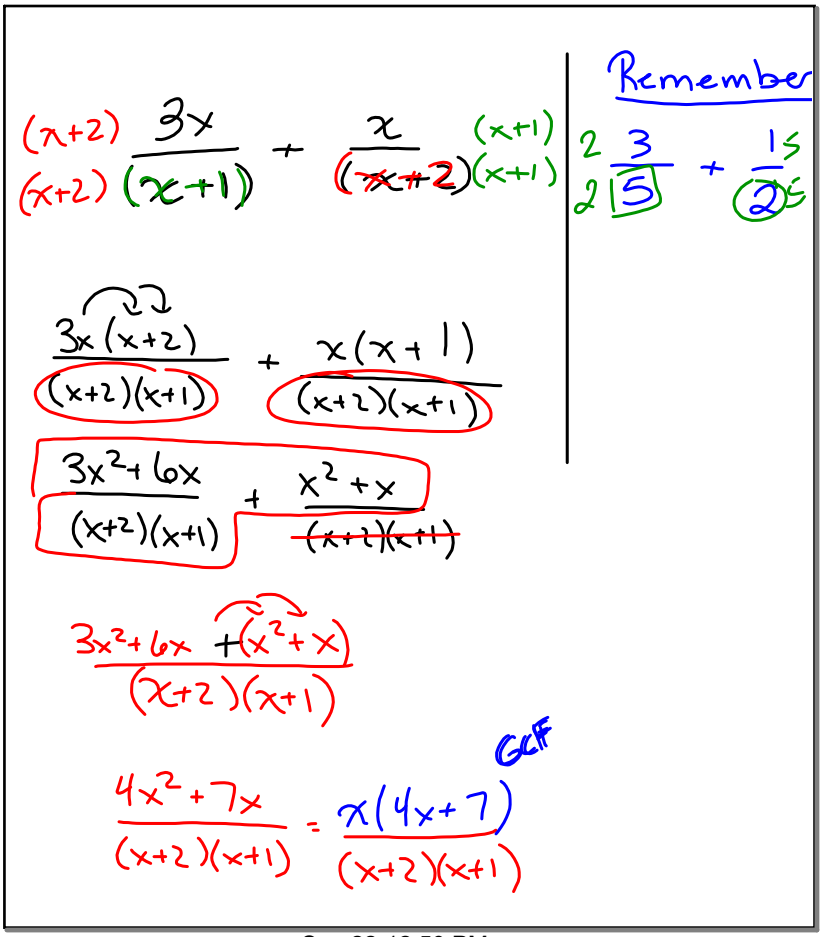

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How to add rational functions

* common denominator

Remember:

$\frac{1}{5} + \frac{3}{5} = \frac{4}{5}$ (1+3)

Same ✓

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

Same ✓

Notes:

$\frac{1}{5} + \frac{4}{5} + \frac{7}{5} = \frac{12}{5}$

$\frac{x}{5} + \frac{6x}{5} + \frac{2x}{5} = \frac{9x}{5}$

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$\frac{1}{5} + \frac{1}{4} + \frac{1}{3} =$

ARE the Denominators the SAME?

5
10
15
20
25
30
35
40
45
50
55
60
65

20/4: 5 20/5: 4 20/3: 6.8

30/5: 6 30/3: 10 30/4: 8.2

$\frac{12 \cdot 1}{12 \cdot 5} + \frac{15 \cdot 1}{15 \cdot 4} + \frac{20 \cdot 1}{20 \cdot 3} =$

$\frac{12}{60} + \frac{15}{60} + \frac{20}{60} = \frac{47}{60}$

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$$\frac{3x}{x-1} + \frac{6x}{x-1}$$

$$\frac{9x}{x-1}$$

$$\frac{1}{x+1} + \frac{2}{x+1} = \frac{3}{x+1}$$

SAME

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$$\frac{3}{x-1} + \frac{4}{x-1}$$

Are the denominators the same?

YES

$$\frac{3+4}{x-1} = \frac{7}{x-1}$$

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

YES

$$\frac{2x+6x}{x^2-4x+1} = \frac{8x}{x^2-4x+1}$$

$$\frac{3x+2}{x^2-x+7} + \frac{6x-5}{x^2-x+7}$$

YES

$$\frac{3x+2+6x-5}{x^2-x+7} = \frac{9x-3}{x^2-x+7}$$

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$\frac{3}{(x+1)} + \frac{5}{(x+2)}$ Not common denominator

$\frac{(x+2)}{(x+2)} \cdot \frac{3}{(x+1)} + \frac{5}{(x+2)} \cdot \frac{(x+1)}{(x+1)}$

$\frac{3x+6}{(x+2)(x+1)} + \frac{5x+5}{(x+2)(x+1)}$

$\frac{3x+6}{(x+2)(x+1)} + \frac{5x+5}{(x+2)(x+1)}$

$\frac{(3x+6)+(5x+5)}{(x+2)(x+1)}$

$\frac{3x+6+5x+5}{(x+2)(x+1)} = \frac{(8x+11)}{(x+2)(x+1)}$

Remember

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

$\frac{6}{15} + \frac{5}{15} = \frac{11}{15}$

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Homework:

1. $\frac{3x+2}{x+5} + \frac{2x-5}{x+5}$

2. $\frac{3x}{5x+1} - \frac{4x}{5x+1}$

3. $\frac{2x-1}{x+2} + \frac{3x+2}{x+5}$

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How to subtract rational functions

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How to multiply rational functions

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How to divide rational functions

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